

Priority #1

Access DB# 166578

# SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: Sim J. Lee Examiner #: 76060 Date: 9-20-05  
 Art Unit: 1752 Phone Number 302-1333 Serial Number: 101800, 195  
 Mail Box and Bldg/Room Location: 9D60 (Rem.) Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

\*\*\*\*\*

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

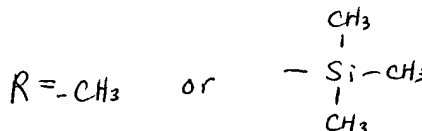
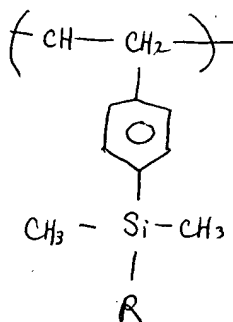
Title of Invention: Plz. see Bib SCIENTIFIC REFERENCE BR  
 Inventors (please provide full names): \_\_\_\_\_ Sci & Tech Inf. Cntr

SEP 22 2005

Earliest Priority Filing Date: \_\_\_\_\_ Pat. & T.M. Office

\*For Sequence Searches Only\* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.

Please search for a resist composition comprising a  
silicon-containing resist polymer ~~or~~ having following formula



## STAFF USE ONLY

Searcher: Bes  
 Searcher Phone #: \_\_\_\_\_  
 Searcher Location: \_\_\_\_\_  
 Date Searcher Picked Up: \_\_\_\_\_  
 Date Completed: 10/07/05  
 Searcher Prep & Review Time: 30  
 Clerical Prep Time: \_\_\_\_\_  
 Online Time: 135

## Type of Search

NA Sequence (#) \_\_\_\_\_  
 AA Sequence (#) \_\_\_\_\_  
 Structure (#) 2  
 Bibliographic ✓  
 Litigation \_\_\_\_\_  
 Fulltext \_\_\_\_\_  
 Patent Family \_\_\_\_\_  
 Other \_\_\_\_\_

## Vendors and cost where applicable

STN \_\_\_\_\_  
 Dialog \_\_\_\_\_  
 Questel/Orbit \_\_\_\_\_  
 Dr.Link \_\_\_\_\_  
 Lexis/Nexis \_\_\_\_\_  
 Sequence Systems \_\_\_\_\_  
 WWW/Internet \_\_\_\_\_  
 Other (specify) \_\_\_\_\_



## UNITED STATES PATENT AND TRADEMARK OFFICE

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Bib Data Sheet

CONFIRMATION NO. 8744

SERIAL NUMBER 10/800,195	FILING DATE 03/12/2004  RULE	CLASS 430	GROUP ART UNIT 1752	ATTORNEY DOCKET NO. 5347.218
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APPLICANTS

Junyan Dai, Ithaca, NY;  
 Christopher K. Ober, Ithaca, NY;  
 Lin Wang, Baton Rouge, LA; Franco Cerrina, Madison, WI;  
 Paul Nealey, Madison, WI;

\*\* CONTINUING DATA \*\*\*\*\*  
 This appln claims benefit of 60/454,062 03/12/2003  
 SJL

\*\* FOREIGN APPLICATIONS \*\*\*\*\*  
 None SJL

IF REQUIRED, FOREIGN FILING LICENSE GRANTED  
 \*\* 05/28/2004

Foreign Priority claimed <input type="checkbox"/> yes <input checked="" type="checkbox"/> no	STATE OR COUNTRY NY	SHEETS DRAWING 10	TOTAL CLAIMS 64	INDEPENDENT CLAIMS 8
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35 USC 119 (a-d) conditions ☐ yes ☒ no Met after  
 Allowance SJL

Verified and  
Acknowledged  
 Examiner's Signature Initials

ADDRESS  
 20792  
 MYERS BIGEL SIBLEY & SAJOVEC  
 PO BOX 37428  
 RALEIGH, NC  
 27627

TITLE  
 Organoelement resists for EUV lithography and methods of making the same

FILING FEE	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT	<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees ( Filing ) <input type="checkbox"/> 1.17 Fees ( Processing Ext. of time )
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# STIC Search Results Feedback Form

**EIC17000**

Questions about the scope or the results of the search? Contact *the EIC searcher* or contact:

Kathleen Fuller, EIC 1700 Team Leader  
571/272-2505 REMSEN 4B28

## Voluntary Results Feedback Form

- I am an examiner in Workgroup:  Example: 1713
- Relevant prior art **found**, search results used as follows:

- ☐ 102 rejection
- ☐ 103 rejection
- ☐ Cited as being of interest.
- ☐ Helped examiner better understand the invention.
- ☐ Helped examiner better understand the state of the art in their technology.

Types of relevant prior art found:

- ☐ Foreign Patent(s)
- ☐ Non-Patent Literature  
(journal articles, conference proceedings, new product announcements etc.)

- Relevant prior art **not found**:

- ☐ Results verified the lack of relevant prior art (helped determine patentability).
- ☐ Results were not useful in determining patentability or understanding the invention.

Comments:

=> file reg

FILE 'REGISTRY' ENTERED AT 12:31:45 ON 04 OCT 2005  
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=> d his full

(FILE 'HOME' ENTERED AT 09:45:32 ON 04 OCT 2005)

FILE 'REGISTRY' ENTERED AT 10:37:35 ON 04 OCT 2005

L4                   STRUCTURE  
                  DIS SIA  
L5                   2 SEA SSS SAM L4  
L6                   228 SEA SSS FUL L4  
                  SAV L6 LEE195C/A  
L7                   182 SEA ABB=ON   PLU=ON   L6 AND PMS/CI

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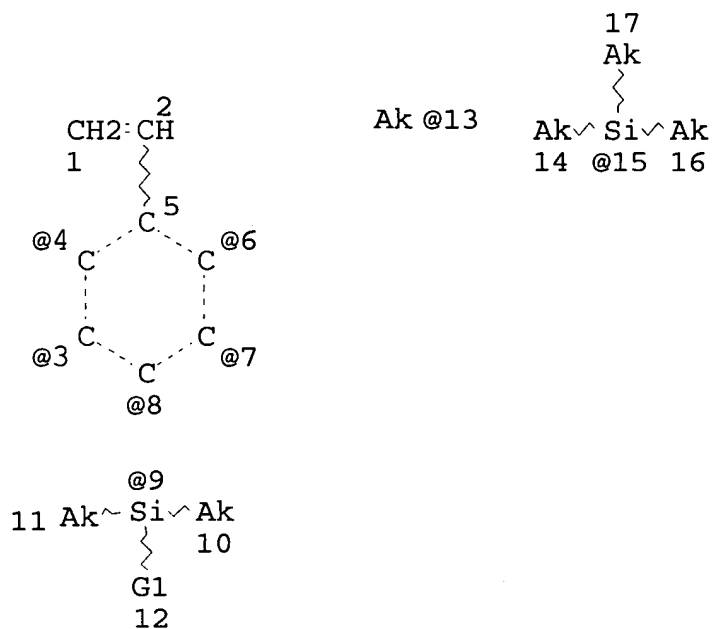
L16                   STRUCTURE  
L17                   1 SEA SUB=L6 SSS SAM L16  
L18                   20 SEA SUB=L6 SSS FUL L16  
                  SAV L18 LEE195D/A

FILE 'HCAPLUS' ENTERED AT 12:03:06 ON 04 OCT 2005

L19               187824 SEA ABB=ON   PLU=ON   RESIST OR RESISTS OR PHOTORESIST? OR  
                  MASK? OR PHOTOMASK?  
L20               112431 SEA ABB=ON   PLU=ON   LITHO? OR PHOTOLITHO? OR CHROMOLITHO?  
  
L25               187 SEA ABB=ON   PLU=ON   L7  
L26               25 SEA ABB=ON   PLU=ON   L18  
                  DIS  
  
L27               14 SEA ABB=ON   PLU=ON   L18 AND (L19 OR L20)  
L28               25 SEA ABB=ON   PLU=ON   L18 OR L27  
  
L29               58 SEA ABB=ON   PLU=ON   L7 AND (L19 OR L20)  
L30               44 SEA ABB=ON   PLU=ON   L29 NOT L28

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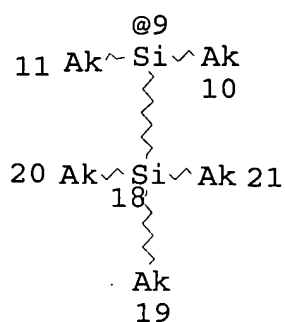
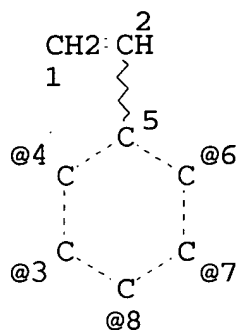
=> d l18 que stat  
L4 STR



VAR G1=13/15  
VPA 9-4/3/8/7/6 U  
NODE ATTRIBUTES:  
DEFAULT MLEVEL IS ATOM  
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
RSPEC 8  
NUMBER OF NODES IS 17

STEREO ATTRIBUTES: NONE  
L6 228 SEA FILE=REGISTRY SSS FUL L4  
L16 STR



VPA 9-4/3/8/7/6 U

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RSPEC 8

NUMBER OF NODES IS 15

STEREO ATTRIBUTES: NONE

L18 20 SEA FILE=REGISTRY SUB=L6 SSS FUL L16

100.0% PROCESSED 21 ITERATIONS

20 ANSWERS

SEARCH TIME: 00.00.01

=> file hcaplus

FILE 'HCAPLUS' ENTERED AT 12:33:51 ON 04 OCT 2005

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=> d 128 1-25 cbib abs hitstr hitind

L28 ANSWER 1 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN

2004:1153348 Document No. 142:240761 Synthesis and Characterization of Silicon-Containing Block Copolymers from Nitroxide-Mediated Living Free Radical Polymerization. Fukukawa, Kenichi; Zhu, Lei; Gopalan, Padma; Ueda, Mitsuru; Yang, Shu (Department of Organic Polymeric Materials, Graduate School of Science and Engineering, Tokyo Institute of Technology, Meguro, Tokyo, 152-8552, Japan). Macromolecules, 38(2), 263-270 (English) 2005. CODEN: MAMOBX. ISSN: 0024-9297. Publisher: American Chemical Society.

AB High etch resistance to oxygen plasma for silicon-contg. polymers, and the high thermal and mech. robustness of the etching product, silicon oxide, make it attractive to design novel silicon-contg. block copolymers for direct patterning of nanostructures on a desired substrate. Here, we report the synthesis of a series of block copolymers from silicon-contg. styrenic monomers and styrene (St) or 4-acetoxystyrene (AcOSt) using living free radical polymn. via a  $\alpha$ -hydride nitroxide-mediated unimer ( $\alpha$ -H unimer). Controlled polymn. with narrow polydispersity ( $PDI < 1.25$ ) and high yield (up to 80%) were achieved by optimizing polymn. time and temp., addn. of solvents, use of rate accelerants, monomer addn. sequence, and solvent polarity. Block copolymer morphologies before and after O<sub>2</sub> plasma were studied using small-angle X-ray scattering (SAXS) and transmission electron microscopy (TEM). When silicon-contg. block formed the major phase and silicon concn. was greater than 12 wt%, the morphol. and domain size were maintained after O<sub>2</sub> plasma.

IT 114442-02-3DP, reaction products with azahexane derivs.

RL: CAT (Catalyst use); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent); USES (Uses) (macroinitiator; synthesis and characterization of silicon-contg. block copolymers from nitroxide-mediated living free radical polymn.)

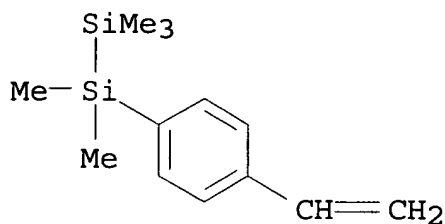
RN 114442-02-3 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, homopolymer (9CI) (CA INDEX NAME)

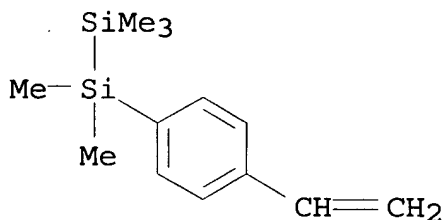
CM 1

CRN 114442-01-2

CMF C13 H22 Si2



IT 114442-01-2P, 4-(Pentamethyldisilyl)styrene  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation);  
 RACT (Reactant or reagent)  
 (monomer; synthesis and characterization of silicon-contg. block  
 copolymers from nitroxide-mediated living free radical polymn.)  
 RN 114442-01-2 HCAPLUS  
 CN Disilane, (4-ethenylphenyl)pentamethyl- (9CI) (CA INDEX NAME)

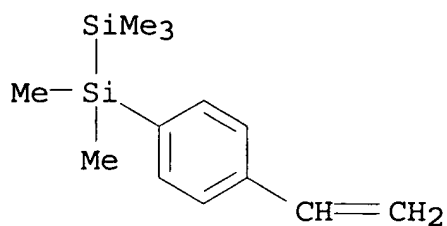


IT 114442-02-3P 166534-24-3P 845664-97-3P,  
 4-Acetoxystyrene-4-(pentamethyldisilyl)styrene block copolymer  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (synthesis and characterization of silicon-contg. block  
 copolymers from nitroxide-mediated living free radical polymn.)  
 RN 114442-02-3 HCAPLUS  
 CN Disilane, (4-ethenylphenyl)pentamethyl-, homopolymer (9CI) (CA  
 INDEX NAME)

CM 1

CRN 114442-01-2  
 CMF C13 H22 Si2





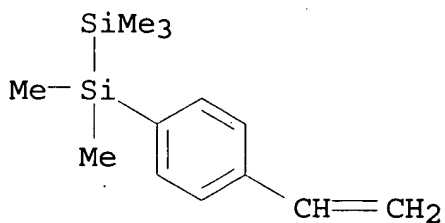
RN 166534-24-3 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, polymer with ethenylbenzene, block (9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

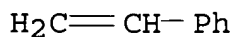
CMF C13 H22 Si2



CM 2

CRN 100-42-5

CMF C8 H8



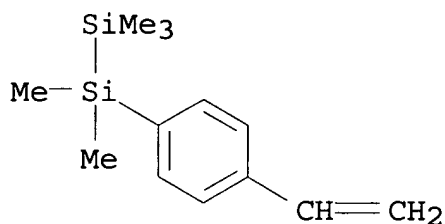
RN 845664-97-3 HCAPLUS

CN Phenol, 4-ethenyl-, acetate, polymer with (4-ethenylphenyl)pentamethyldisilane, block (9CI) (CA INDEX NAME)

CM 1

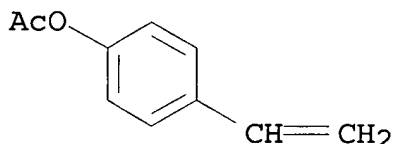
CRN 114442-01-2

CMF C13 H22 Si2



CM 2

CRN 2628-16-2  
CMF C10 H10 O2



- CC 35-4 (Chemistry of Synthetic High Polymers)
- IT 2564-83-2DP, 2,2,6,6-Tetramethylpiperidinyloxy, reaction products with acetoxystyrene homopolymer 9003-53-6DP, Polystyrene, reaction products with azahexane derivs. 24979-78-0DP, 4-Acetoxystyrene homopolymer, reaction products with nitroxides 114442-02-3DP, reaction products with azahexane derivs. 227000-59-1DP, reaction products with styrene deriv. polymers  
RL: CAT (Catalyst use); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent); USES (Uses)  
(macroinitiator; synthesis and characterization of silicon-contg. block copolymers from nitroxide-mediated living free radical polymn.)
- IT 99794-58-8P 104109-22-0P, 4-[Bis(trimethylsilyl)methyl]styrene 114442-01-2P, 4-(Pentamethyldisilyl)styrene  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
(monomer; synthesis and characterization of silicon-contg. block copolymers from nitroxide-mediated living free radical polymn.)
- IT 24979-78-0P, 4-Acetoxystyrene homopolymer 99802-27-4DP, reaction products with azahexane derivs. 99802-27-4P 113150-94-0DP, 4-[Bis(trimethylsilyl)methyl]styrene homopolymer, reaction products with azahexane derivs. 113150-94-0P, 4-[Bis(trimethylsilyl)methyl]styrene homopolymer 114442-02-3P 166534-24-3P 845664-96-2P, 4-Acetoxystyrene-4-

(pentamethyldisiloxymethyl)styrene block copolymer  
845664-97-3P, 4-Acetoxystyrene-4-(pentamethyldisilyl)styrene  
block copolymer 845664-98-4P, 4-Acetoxystyrene-4-  
[bis(trimethylsilyl)methyl]styrene block copolymer 845674-35-3P,  
4-[Bis(trimethylsilyl)methyl]styrene-styrene block copolymer  
845674-36-4P, 4-(Pentamethyldisiloxymethyl)styrene-styrene block  
copolymer

RL: SPN (Synthetic preparation); PREP (Preparation)  
(synthesis and characterization of silicon-contg. block  
copolymers from nitroxide-mediated living free radical polymn.)

L28 ANSWER 2 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN

2004:234456 Document No. 141:23975 Living free radical polymerization  
of silicon-containing block copolymers. Fukukawa, Ken-ichi;  
Gopalan, Padma; Ueda, Mitsuru; Yang, Shu (Department of Organic &  
Polymeric Materials, Graduate School of Science and Engineering,  
Tokyo Institute of Technology, Tokyo, Japan). Polymer Preprints  
(American Chemical Society, Division of Polymer Chemistry), 45(1),  
620-621 (English) 2004. CODEN: ACPPAY. ISSN: 0032-3934.  
Publisher: American Chemical Society, Division of Polymer Chemistry.

AB We report the living free radical polymn. of several types of  
styrenic silicon-contg. block copolymers using a nitroxide mediated  
unimer. To overcome the low reactivity and thermal stability of  
silicon-contg. monomers at high temps., we introduce an appropriate  
polar solvent and/or accelerating agent into polymn. Narrow  
distributed (polydispersity, PDI .apprx.1.1) block copolymers were  
obtained under mild polymn. conditions, .apprx.100° for a  
short period of time and achieve a relatively high conversion. Such  
silicon-contg. block copolymers may be potentially used as a  
**mask** for direct nanopatterning on a substrate of interest  
without multiple-step process.

IT 114442-02-3P 697802-94-1P

RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. and characterization of)

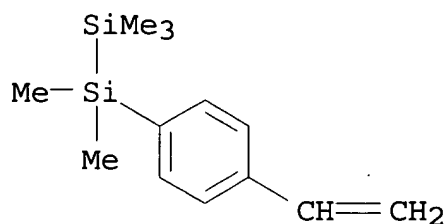
RN 114442-02-3 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, homopolymer (9CI) (CA  
INDEX NAME)

CM 1

CRN 114442-01-2

CMF C13 H22 Si2



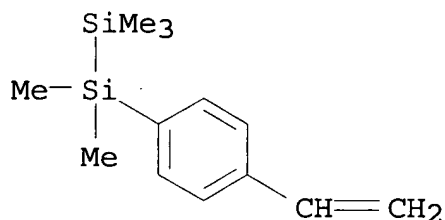
RN 697802-94-1 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, polymer with ethenylbenzene, diblock (9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

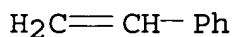
CMF C13 H22 Si2



CM 2

CRN 100-42-5

CMF C8 H8



CC 35-4 (Chemistry of Synthetic High Polymers)

IT 99802-27-4P 113150-94-0P, 4-(Bis(trimethylsilyl)methyl)styrene homopolymer **114442-02-3P** 697799-38-5P  
**697802-94-1P** 697802-95-2P

RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. and characterization of)

L28 ANSWER 3 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN

2003:569987 Document No. 140:207331 Synthesis and evaluation of novel

organo-element **resists** for EUV lithography.

Dai, Junyan; Ober, Christopher K.; Kim, Sang-Ouk; Nealey, Paul F.; Golovkina, Victoria; Shin, Jangho; Wang, Lin; Cerrina, Franco (Materials Science and Engineering, Cornell Univ., Ithaca, NY, 14853, USA). Proceedings of SPIE-The International Society for Optical Engineering, 5039(Pt. 2, Advances in Resist Technology and Processing XX), 1164-1172 (English) 2003. CODEN: PSISDG. ISSN: 0277-786X. Publisher: SPIE-The International Society for Optical Engineering.

June 2003

AB Extreme-UV (EUV) **lithog.** is to date the most promising NGL technol. for the sub-50 nm technol. node. The authors designed and synthesized several types of organoelement **resists** with min. oxygen content for high transparency. Either silicon or boron was incorporated in the **resist** structures to improve both etch resistance and transparency. In the exposure studies, it was possible to image the silicon-contg. polymers to 22.5 nm line/space patterns using EUV interferometry. A second type of EUV transparent **resist** platform was studied involving boron-contg. polymers. Carborane carboxylic acid was attached to a copolymer backbone to introduce boron atoms with controlled structure attachment level. In a preliminary study, these polymers could be imaged by 248 nm exposure. Effect of structure on line edge roughness is also to be included in the discussion.

IT 662152-18-3D, hydrolyzed  
RL: PRP (Properties); TEM (Technical or engineered material use);  
USES (Uses)

(prepn. of silicon-contg. polymer **photoresists** with high sensitivity and etch resistance for extreme-UV **lithog.**)

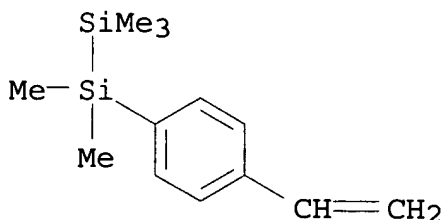
RN 662152-18-3 HCAPLUS

CN Carbonic acid, 1,1-dimethylethyl 4-ethenylphenyl ester, polymer with (4-ethenylphenyl)pentamethyldisilane (9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

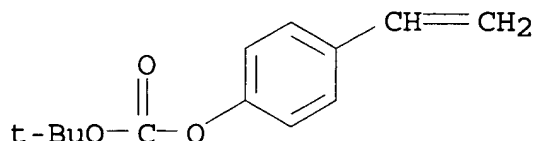
CMF C13 H22 Si2



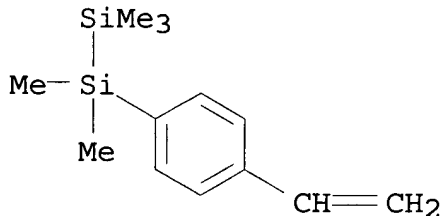
CM 2

CRN 87188-51-0

CMF C13 H16 O3



IT **114442-01-2, 4-Pentamethyldisilylstyrene**  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (prepn. of silicon-contg. polymer **photoresists** with  
 high sensitivity and etch resistance for extreme-UV  
**lithog.**)  
 RN 114442-01-2 HCAPLUS  
 CN Disilane, (4-ethenylphenyl)pentamethyl- (9CI) (CA INDEX NAME)



CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and  
 Other Reprographic Processes)  
 ST silicon boron contg polymer **photoresist** extreme UV  
**lithog**  
 IT Polymers, properties  
 RL: PRP (Properties); TEM (Technical or engineered material use);  
 USES (Uses)  
 (block; properties of boron-contg. polymer **photoresists**  
 with high sensitivity and etch resistance for extreme-UV  
**lithog.**)  
 IT Sputtering  
 (etching, reactive, resistance; properties of Si- and B-contg.  
 polymer **photoresists** with high sensitivity and etch  
 resistance for extreme-UV **lithog.**)  
 IT Negative **photoresists**  
 (extreme-UV, chem. amplified; prepn. of boron-contg. polymer  
**photoresists** with high sensitivity and etch resistance)

- for extreme-UV lithog.)
- IT Positive **photoresists**  
(extreme-UV, chem. amplified; properties of silicon-contg. polymer **photoresists** with high sensitivity and etch resistance for extreme-UV lithog.)
- IT Sulfonium compounds  
RL: PRP (Properties); TEM (Technical or engineered material use);  
USES (Uses)  
(photoacid generator; properties of Si- and B-contg. polymer **photoresists** with high sensitivity and etch resistance for extreme-UV lithog.)
- IT Hydroboration  
(prepn. of boron-contg. polymer **photoresists** with high sensitivity and etch resistance for extreme-UV lithog.)
- IT Surface roughness  
(properties of Si- and B-contg. polymer **photoresists** with high sensitivity and etch resistance for extreme-UV lithog.)
- IT Etching  
(sputter, reactive, resistance; properties of Si- and B-contg. polymer **photoresists** with high sensitivity and etch resistance for extreme-UV lithog.)
- IT 662152-19-4 662152-20-7 662152-21-8  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(prepn. of boron-contg. polymer **photoresists** with high sensitivity and etch resistance for extreme-UV lithog.)
- IT 662152-18-3D, hydrolyzed  
RL: PRP (Properties); TEM (Technical or engineered material use);  
USES (Uses)  
(prepn. of silicon-contg. polymer **photoresists** with high sensitivity and etch resistance for extreme-UV lithog.)
- IT 114442-01-2, 4-Pentamethyldisilylstyrene  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(prepn. of silicon-contg. polymer **photoresists** with high sensitivity and etch resistance for extreme-UV lithog.)
- IT 105729-79-1D, Isoprene-styrene block copolymer, hydroxylated esters with 1-carboxycarborane 105729-79-1D, Isoprene-styrene block copolymer, hydroxylated, hydroboration products 662152-19-4D, reaction product with isoprene-styrene block copolymer  
RL: PRP (Properties); TEM (Technical or engineered material use);  
USES (Uses)  
(properties of boron-contg. polymer **photoresists** with high sensitivity and etch resistance for extreme-UV lithog.)
- IT 662152-17-2D, Poly(4-trimethylsilylstyrene-4-acetoxystyrene), hydrolyzed

RL: PRP (Properties); TEM (Technical or engineered material use);  
USES (Uses)

(properties of silicon-contg. polymer **photoresists** with  
high sensitivity and etch resistance for extreme-UV  
**lithog.**)

L28 ANSWER 4 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN

2003:448691 Document No. 139:165029 Anionic Polymerization of  
p-Pentamethyldisilyl-, p-Heptamethyltrisilyl-, and  
p-nonamethyltetrasilylstyrenes. Hirao, Akira; Ando, Yushi;  
Ishizone, Takashi; Nakahama, Seiichi (Polymeric and Organic  
Materials Department, Graduate School of Science and Technology,  
Tokyo Institute of Technology, Tokyo, 152-8552, Japan).  
Macromolecules, 36(14), 5081-5087 (English) 2003. CODEN: MAMOBX.  
ISSN: 0024-9297. Publisher: American Chemical Society.

AB The anionic polymns. of p-pentamethyldisilylstyrene (1),  
p-heptamethyltrisilylstyrene (2), and p-nonamethyltetrasilylstyrene  
(3) were carried out under various conditions. The polymns. of 1  
and 2 proceeded in a living manner in THF at -78 °C to quant.  
afford polymers with predictable mol. wts. and narrow mol. wt.  
distributions. Suitable initiators for these living anionic  
polymns. were sec-BuLi, lithium, sodium, and potassium  
naphthalenides, cumylpotassium, and living oligomers of  
 $\alpha$ -methylstyrene lithium, sodium, and potassium salts.  
Well-defined diblock copolymers, poly(1)-block-polystyrene,  
poly(2)-block-polystyrene, polystyrene-block-poly(1), and  
polystyrene-block-poly(2) were successfully synthesized under  
similar conditions by a two-step sequential monomer addn., namely,  
styrene followed by 1 or 2, or vice versa. In contrast, the polymn.  
of 3 was problematic. No polymer was obtained in the polymn. of 3  
in either THF at -78 °C or benzene at 40 °C with  
sec-BuLi and oligo( $\alpha$ -methylstyryl)lithium. Using  
oligo( $\alpha$ -methylstyryl)potassium as an initiator, 3 was polymd.  
quant. in THF at -78 °C for 0.5 h. Unfortunately, the side  
reaction, presumably attack of the Si-Si-Si-Si bond by the growing  
chain-end anion, could not be completely suppressed during the  
polymn., which resulted in the formation of high mol. wt. polymers  
by coupling between polymer chains.

IT 114442-02-3P, p-Pentamethyldisilylstyrene homopolymer  
166534-24-3P, p-Pentamethyldisilylstyrene-styrene block  
copolymer

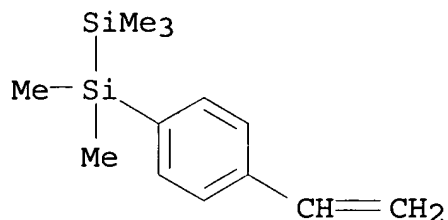
RL: SPN (Synthetic preparation); PREP (Preparation)  
(anionic polymn. of alkylsilylstyrenes)

RN 114442-02-3 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, homopolymer (9CI) (CA  
INDEX NAME)



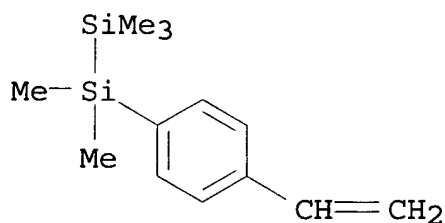
CRN 114442-01-2  
CMF C13 H22 Si2



RN 166534-24-3 HCAPLUS  
CN Disilane, (4-ethenylphenyl)pentamethyl-, polymer with  
ethenylbenzene, block (9CI) (CA INDEX NAME)

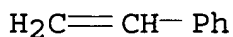
CM 1

CRN 114442-01-2  
CMF C13 H22 Si2



CM 2

CRN 100-42-5  
CMF C8 H8



CC 35-4 (Chemistry of Synthetic High Polymers)  
IT 114442-02-3P, p-Pentamethyldisilylstyrene homopolymer  
116695-42-2P, Tetrasilane, 1-(4-ethenylphenyl)-1,1,2,2,3,3,4,4,4-  
nonamethyl-, homopolymer 116695-43-3P 166534-24-3P,  
p-Pentamethyldisilylstyrene-styrene block copolymer 166534-25-4P,

p-(Heptamethyltrisilyl)styrene-styrene block copolymer  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(anionic polymn. of alkylsilylstyrenes)

L28 ANSWER 5 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN

2002:799485 Document No. 139:108560 Organoelement **resists**

for EUV **lithography**. Dai, Junyan; Ober, Christopher  
Kemper; Wang, Lin; Cerrina, Franco; Nealey, Paul F. (Mater. Sci.  
Eng., Cornell Univ., Ithaca, NY, 14853, USA). Proceedings of  
SPIE-The International Society for Optical Engineering, 4690(Pt. 2,  
Advances in Resist Technology and Processing XIX), 1193-1202  
(English) 2002. CODEN: PSISDG. ISSN: 0277-786X. Publisher:  
SPIE-The International Society for Optical Engineering.

AB Extreme-UV (EUV) **lithog.** is perhaps the most promising of  
the NGL technologies for sub-100 nm resolu. To address needs in  
this area, the authors designed and synthesized several types of  
organo-element **resists** using only low absorbing elements,  
including H, C, Si and B. One category is based on silicon-contg.  
block and random polymers. They show high transparency according to  
theor. simulations and have high oxygen reactive ion etch  
resistances compared to Novolak resins. In a preliminary study, the  
authors were able to image these polymers to 180 nm line/space  
patterns using EUV exposure. A second type of EUV transparent  
**resist** platform involves boron-contg. polymers. Carborane  
carboxylic acid was attached to a copolymer backbone to introduce  
boron atoms with controlled attachment level. It was found that  
incorporation of a small amt. of B provides remarkably high oxygen  
etch resistance.

IT 122551-15-9P, 4-Pentamethyldisilylstyrene-p-  
chloromethylstyrene copolymer

RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or  
engineered material use); PREP (Preparation); USES (Uses)

(synthesis and **lithog.** properties of silicon-contg.  
block and random polymers and boron-contg. polymers for  
extreme-UV **lithog. resist** application)

RN 122551-15-9 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, polymer with  
1-(chloromethyl)-4-ethenylbenzene (9CI) (CA INDEX NAME)

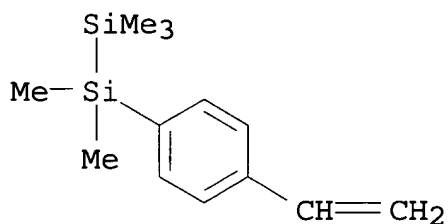
CM 1

CRN 114442-01-2

CMF C13 H22 Si2

July 2002

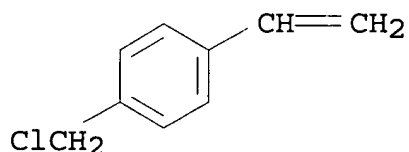
Same Invention Entry



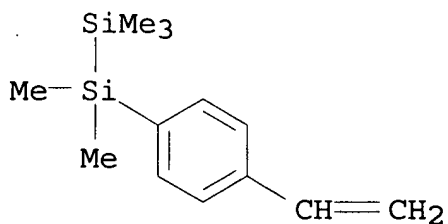
CM 2

CRN 1592-20-7

CMF C9 H9 Cl



IT **114442-01-2P**, 4-Pentamethyldisilylstyrene  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation);  
 RACT (Reactant or reagent)  
 (synthesis of silicon-contg. block and random polymers and  
 boron-contg. polymers for **resists** for extreme-UV  
**lithog.**)  
 RN 114442-01-2 HCAPLUS  
 CN Disilane, (4-ethenylphenyl)pentamethyl- (9CI) (CA INDEX NAME)



CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and  
 Other Reprographic Processes)  
 ST extreme UV **lithog photoresist** silicon boron  
 contg polymer  
 IT Polymers, properties

RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(block; synthesis and **lithog.** properties of silicon-contg. block and random polymers and boron-contg. polymers for extreme-UV **lithog. resist** application)

IT X-ray **resists**

(design and properties of silicon-contg. block and random polymers and boron-contg. polymers for oxygen etch resistant **resists** for extreme-UV **lithog.** in relation to)

IT Negative **photoresists**

(extreme-UV; design and **lithog.** properties of silicon-contg. block and random polymers and boron-contg. polymers for oxygen etch resistant **resists** for extreme-UV **lithog.**)

IT **Photoresists**

(extreme-UV; design and properties of silicon-contg. block and random polymers and boron-contg. polymers for oxygen etch resistant **resists** for extreme-UV **lithog.**)

IT Optical transmission

(extreme-UV; synthesis and **lithog.** properties of silicon-contg. block and random polymers and boron-contg. polymers for extreme-UV **lithog. resist** application)

IT Etching

(plasma, resistance; synthesis and **lithog.** properties of silicon-contg. block and random polymers and boron-contg. polymers for extreme-UV **lithog. resist** application)

IT Hydroboration

Hydrosilylation

Polymer morphology

(synthesis and **lithog.** properties of silicon-contg. block and random polymers and boron-contg. polymers for extreme-UV **lithog. resist** application)

IT 557099-49-7

RL: PRP (Properties)

(comparison compd.; synthesis and **lithog.** properties of silicon-contg. block and random polymers and boron-contg. polymers for extreme-UV **lithog. resist** application)

IT 40101-88-0DP, reaction product with hydrolyzed isoprene-styrene block copolymer

RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(hydroboration of isoprene-styrene block copolymer for extreme-UV **photoresist** application)

IT 40101-88-0P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation);  
 RACT (Reactant or reagent)

(hydroboration of isoprene-styrene block copolymer for extreme-UV  
**photoresist** application)

IT 7782-44-7, Oxygen, uses

RL: NUU (Other use, unclassified); USES (Uses)

(plasma etch; synthesis and **lithog.** properties of  
 silicon-contg. block and random polymers and boron-contg.  
 polymers for extreme-UV **lithog. resist**  
 application)

IT 557099-43-1P, Dimethylphenylvinylsilane-isoprene block copolymer

RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or  
 engineered material use); PREP (Preparation); USES (Uses)

(synthesis and etch resistance of silicon-contg. block and random  
 polymers and boron-contg. polymers for extreme-UV **lithog**  
**. resist** application)

IT 617-86-7DP, Triethylsilane, reaction product with isoprene-styrene  
 block copolymer 758-21-4DP, Dimethylethylsilane, reaction product  
 with isoprene-styrene block copolymer 766-77-8DP,

Dimethylphenylsilane, reaction product with isoprene-styrene block  
 copolymer 51458-06-1DP, Dimesitylborane, reaction product with  
 hydrolyzed isoprene-styrene block copolymer 105729-79-1DP,

Isoprene-styrene block copolymer, hydrosilylation and hydroboration  
 products **122551-15-9P**, 4-Pentamethyldisilylstyrene-p-  
 chloromethylstyrene copolymer 557099-44-2P, p-

Trimethylsilylstyrene-isoprene block copolymer 557099-45-3P,  
 p-Trimethylsilylstyrene-p-chloromethylstyrene copolymer

RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or  
 engineered material use); PREP (Preparation); USES (Uses)

(synthesis and **lithog.** properties of silicon-contg.  
 block and random polymers and boron-contg. polymers for  
 extreme-UV **lithog. resist** application)

IT 1009-43-4P, p-Trimethylsilylstyrene **114442-01-2P**,  
 4-Pentamethyldisilylstyrene

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation);  
 RACT (Reactant or reagent)

(synthesis of silicon-contg. block and random polymers and  
 boron-contg. polymers for **resists** for extreme-UV  
**lithog.**)

L28 ANSWER 6 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN

2002:654436 Document No. 137:192767 Nanoscale patterning of  
 salt-formable block or graft copolymer material by microphase  
 separation. Hiraoka, Toshiro; Asakawa, Koji (Toshiba Corp., Japan).

Jpn. Kokai Tokkyo Koho JP 2002241532 A2 20020828, 12 pp.

(Japanese). CODEN: JKXXAF. APPLICATION: JP 2001-40617 20010216.

AB Title process comprises (A) molding of  $\geq 1$  salt-formable block  
 or graft copolymer and (B) forming of microphases by transforming

the salt-formable groups into salts. Thus, a soln. contg. 2 wt% diblock copolymer of 4-vinylpyridine and Me methacrylate and 0.5 wt% acid-releasable agent NAI-105 was spin-coated on an SiO substrate, irradiated with UV light, and heated to form an islands-in-the-sea dot pattern.

IT 451514-42-4P, p-Pentamethyldisilylstyrene-2-vinylpyridine block copolymer 784167-05-1P

RL: CPS (Chemical process); IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)

(diblock; in nanoscale patterning of salt-formable block or graft copolymer material by microphase sepn.)

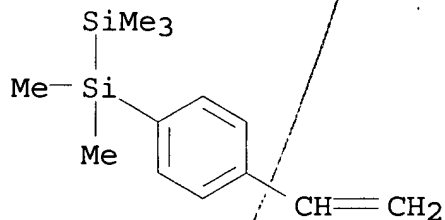
RN 451514-42-4 HCAPLUS

CN Pyridine, 2-ethenyl-, polymer with (4-ethenylphenyl)pentamethyldisilane, block (9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

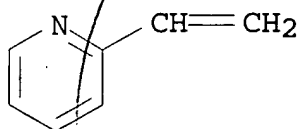
CMF C13 H22 Si2



CM 2

CRN 100-69-6

CMF C7 H7 N



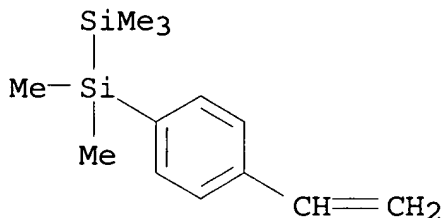
RN 784167-05-1 HCAPLUS

CN Pyridine, 2-ethenyl-, polymer with (4-ethenylphenyl)pentamethyldisilane, diblock (9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

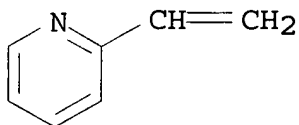
CMF C13 H22 Si2



CM 2

CRN 100-69-6

CMF C7 H7 N



IC ICM C08J009-26

ICS G03F007-004; G11B005-84; H01L021-3065

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

Section cross-reference(s): 38, 76, 77

IT **Lithography**

(nano-; of salt-formable block or graft copolymer material by microphase sepn. for)

IT 124916-37-6P, Methacrylic acid-styrene block copolymer

146228-15-1P, Methyl methacrylate-4-vinylpyridine block copolymer

**451514-42-4P**, p-Pentamethyldisilylstyrene-2-vinylpyridine block copolymer 737791-65-0P 744198-61-6P **784167-05-1P**

RL: CPS (Chemical process); IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)

(diblock; in nanoscale patterning of salt-formable block or graft copolymer material by microphase sepn.)

L28 ANSWER 7 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN

2002:136085 Document No. 136:192715 Method of manufacturing semiconductor capacitor with a triblock copolymer layer. Linliu, Kung (Taiwan Semiconductor Manufacturing Co., Ltd., Taiwan). U.S. US 6348707 B1 20020219, 9 pp. (English). CODEN: USXXAM. APPLICATION: US 2000-675971 20000929.

AB A method is presented for manufg. dynamic random access memory (DRAM) capacitor. A semiconductor substrate having an insulation layer thereon is supplied. A triblock copolymer layer is formed over the insulation layer by performing a spin-coating process. The triblock copolymer layer is patterned and then the triblock copolymer layer is annealed at a low temp. The annealed triblock copolymer is exposed to UV rays in an atm. contg. ozone so that the triblock copolymer is converted into a lower electrode layer having a bi-continuous 3-dimensional nanoporous structure. A dielec. layer is formed over the lower electrode. An upper electrode is formed over the dielec. layer. The upper electrode, the dielec. layer and the lower electrode are sequentially patterned to form the DRAM capacitor. The lower electrode made from bi-continuous ceramic material is able to allow for greater surface area and hence is suitable for forming the capacitors in a DRAM unit with storage capacity of 64 MB or more.

IT 207858-38-6 845821-83-2

RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(capacitor electrode material; method of manufg. semiconductor capacitor with a triblock copolymer layer)

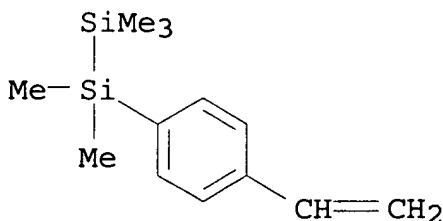
RN 207858-38-6 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, polymer with 2-methyl-1,3-butadiene, block (9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

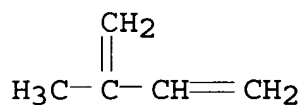
CMF C13 H22 Si2



CM 2



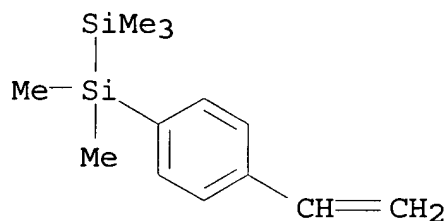
CRN 78-79-5  
CMF C5 H8



RN 845821-83-2 HCAPLUS  
CN Disilane, (4-ethenylphenyl)pentamethyl-, polymer with  
2-methyl-1,3-butadiene, triblock (9CI) (CA INDEX NAME)

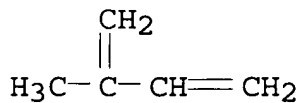
CM 1

CRN 114442-01-2  
CMF C13 H22 Si2



CM 2

CRN 78-79-5  
CMF C5 H8



IC ICM H01L029-72  
INCL 257296000  
CC 76-3 (Electric Phenomena)  
Section cross-reference(s): 38  
IT 207858-38-6 845821-83-2  
RL: DEV (Device component use); TEM (Technical or engineered  
material use); USES (Uses)

(capacitor electrode material; method of manufg. semiconductor capacitor with a triblock copolymer layer)

L28 ANSWER 8 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN

2001:124679 Document No. 134:226003 Room-Temperature Synthesis of a-SiO<sub>2</sub> Thin Films by UV-Assisted Ozonolysis of a Polymer Precursor oxidation. Brinkmann, Martin; Chan, Vanessa Z.-H.; Thomas, Edwin L.; Lee, Victor Y.; Miller, Robert D.; Hadjichristidis, Nikos; Avgeropoulos, Apostolos (Department of Material Science and Engineering, Massachusetts Institute of Technology, Cambridge, MA, 02139, USA). Chemistry of Materials, 13(3), 967-972 (English) 2001. CODEN: CMATEX. ISSN: 0897-4756. Publisher: American Chemical Society.

AB A room-temp. synthesis route for thin films of amorphous silica (a-SiO<sub>2</sub>) based on irradiation of a silicon-containing polymer by UV light in pure O<sub>2</sub> atmosphere has been developed. The chemical conversion of spin-coated films of poly(pentamethyldisilylstyrene) (pPMDSS) to silicon oxycarbide and finally to amorphous silica is achieved by UV-assisted ozonolysis. The conversion process has been followed by Fourier transform IR spectroscopy (FTIR), ellipsometry, and X-ray photoelectron (XPS) and Auger electron spectroscopies (AES). The control of the irradiation time allows for control of the chemical composition of the converted films ranging from that of a silicon oxycarbide for short exposure times to that of a-SiO<sub>2</sub> after 18 h of exposure. The surface composition of the fully converted films obtained by XPS is characterized by an atomic ratio O/Si = 2.00 ± 0.07. Auger electron depth profiles reveal a uniform chemical composition of the a-SiO<sub>2</sub> films with a residual carbon content in the bulk of the films below 1%. Converted a-SiO<sub>2</sub> films of thicknesses up to 150 nm were achieved. Ellipsometry shows that the conversion of the films to a-SiO<sub>2</sub> is accompanied by a progressive decrease of the film thickness and evolution of the refractive index to an asymptotic value of 1.44. The film surface of the converted films probed by optical microscopy over large areas and by atomic force microscopy (AFM) does not show any cracks and is atomically flat with a RMS roughness below 0.4 nm.

IT 114442-02-3, Poly(pentamethyldisilylstyrene)

RL: PEP (Physical, engineering or chemical process); PROC (Process) (precursor; room-temp. synthesis and properties of amorphous SiO<sub>2</sub> thin films by UV-assisted ozonolysis of a polymer precursor)

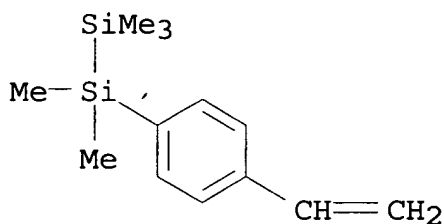
RN 114442-02-3 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

CMF C13 H22 Si2



CC 57-1 (Ceramics)

Section cross-reference(s): 38

IT **114442-02-3**, Poly(pentamethyldisilylstyrene)

RL: PEP (Physical, engineering or chemical process); PROC (Process) (precursor; room-temp. synthesis and properties of amorphous SiO<sub>2</sub> thin films by UV-assisted ozonolysis of a polymer precursor)

L28 ANSWER 9 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN

2000:35044 Document No. 132:100456 Periodic porous and relief nanostructured articles. Chan, Vanessa Z. H.; Thomas, Edwin L.; Lee, Victor Y.; Miller, Robert D.; Avgeropoulos, Apostolos; Hadjichristidis, Nikos (Massachusetts Institute of Technology, USA). PCT Int. Appl. WO 2000002090 A2 20000113, 94 pp. DESIGNATED STATES: W: AU, CA, JP, US; RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (English). CODEN: PIXXD2. APPLICATION: WO 1999-US15068 19990702. PRIORITY: US 1998-91676 19980702.

AB The current invention involves periodically ordered nanostructured articles and methods of using and modifying the articles. In some embodiments, the invention provides periodically structured microphase-sepd. polymeric articles that include periodically occurring sep. domains. The polymeric species comprising one or more of the domains, for some embodiments, contains an inorg. species capable of forming an inorg. oxide ceramic. In another aspect, the invention provides methods for modifying the polymeric articles by oxidn. and/or radiation to form periodically structured porous and relief articles that, in some embodiments, include a ceramic oxide in their structure. The invention also provides methods of use for the novel articles and novel structures constructed utilizing the articles.

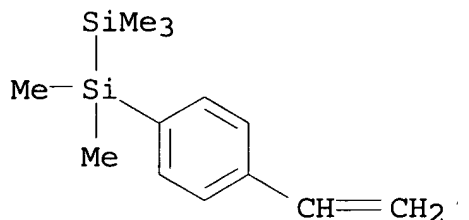
IT **114442-01-2P**, p-Pentamethyldisilylstyrene  
**114442-02-3P**

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

(prepn. and reaction in prepg. block copolymers for forming periodic porous and relief nanostructured materials)

RN 114442-01-2 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl- (9CI) (CA INDEX NAME)



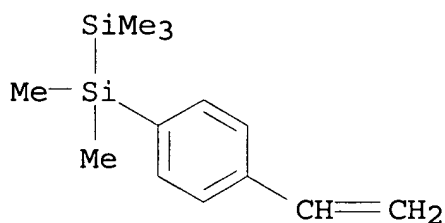
RN 114442-02-3 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

CMF C13 H22 Si2



IT 207858-38-6P, Isoprene-p-pentamethyldisilylstyrene block copolymer

RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(prepn. and use in forming periodic porous and relief nanostructured materials for photolithog.)

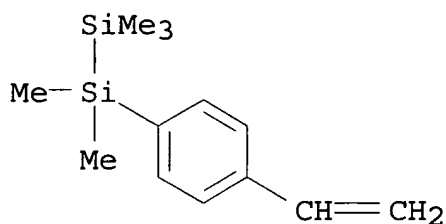
RN 207858-38-6 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, polymer with 2-methyl-1,3-butadiene, block (9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

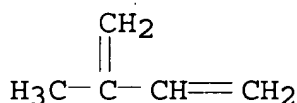
CMF C13 H22 Si2



CM 2

CRN 78-79-5

CMF C5 H8



- IC ICM G03F007-004
- CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
- IT **Photolithography**  
(periodic porous and relief nanostructured materials as **photoresists** and oxygen reactive ion barriers for)
- IT Integrated circuits  
(periodic porous and relief nanostructured materials as **photoresists** and oxygen reactive ion barriers for fabrication of)
- IT **Photoresists**  
(periodic porous and relief nanostructured materials for)
- IT **114442-01-2P**, p-Pentamethyldisilylstyrene  
**114442-02-3P**  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
(prepn. and reaction in prepg. block copolymers for forming periodic porous and relief nanostructured materials)
- IT **207858-38-6P**, Isoprene-p-pentamethyldisilylstyrene block copolymer  
RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(prepn. and use in forming periodic porous and relief nanostructured materials for **photolithog.**)

1999:776548 Document No. 132:96761 Ordered bicontinuous nanoporous and nanorelief ceramic films from self assembling polymer precursors. Chan, Vanessa Z.-H.; Hoffman, James; Lee, Victor Y.; Latrou, Hermis; Avgeropoulos, Apostolos; Hadjichristidis, Nikos; Miller, Robert D. (Dep. Materials Sci. and Eng., Massachusetts Inst. Tech., Cambridge, MA, 02139, USA). Science (Washington, D. C.), 286(5445), 1716-1719 (English) 1999. CODEN: SCIEAS. ISSN: 0036-8075. Publisher: American Association for the Advancement of Science.

AB Three-dimensional ceramic nanostructured films were produced from silicon-contg. triblock copolymer films exhibiting the double gyroid and inverse double gyroid morphologies (space group Ia3d). A one-step room-temp. oxidn. process that used ozonolysis and UV irradiation effected both the selective removal of the hydrocarbon block and the conversion of the silicon-contg. block to a silicon oxycarbide ceramic stable to 400°C. Depending on the relative vol. fraction of the hydrocarbon block to the silicon-contg. block, either nanoporous or nanorelief structures were fabricated with calcd. interfacial areas of .apprx.40 m<sup>2</sup>/g and pore or strut sizes of .apprx.20 nm.

IT 114442-02-3P, Poly(pentamethyldisilylstyrene)

207858-38-6P, Isoprene-p-(pentamethyldisilylstyrene) block copolymer

RL: PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)

(precursor; ordered bicontinuous nanoporous and nanorelief ceramic films from self assembling polymer precursors)

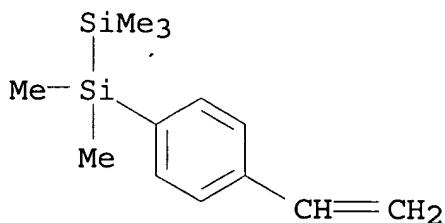
RN 114442-02-3 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

CMF C13 H22 Si2



RN 207858-38-6 HCAPLUS

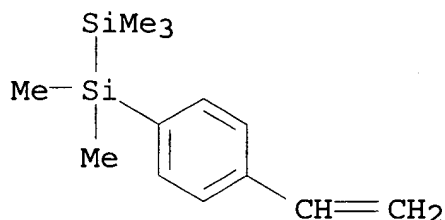
CN Disilane, (4-ethenylphenyl)pentamethyl-, polymer with

2-methyl-1,3-butadiene, block (9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

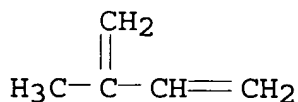
CMF C13 H22 Si2



CM 2

CRN 78-79-5

CMF C5 H8



CC 57-2 (Ceramics)

IT 9003-31-0P, Polyisoprene 114442-02-3P,

Poly(pentamethyldisilylstyrene) 207858-38-6P,

Isoprene-p-(pentamethyldisilylstyrene) block copolymer

RL: PEP (Physical, engineering or chemical process); PRP

(Properties); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)

(precursor; ordered bicontinuous nanoporous and nanorelief ceramic films from self assembling polymer precursors)

L28 ANSWER 11 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN

1998:729070 Document No. 130:66978 Curious Morphology of

Silicon-Containing Polymer Films on Exposure to Oxygen Plasma.

Chan, Vanessa Z.-H.; Thomas, Edwin L.; Frommer, Jane; Sampson,

David; Campbell, Richard; Miller, Dolores; Hawker, Craig; Lee,

Victor; Miller, Robert D. (Department of Materials Science and

Engineering, Massachusetts Institute of Technology, Cambridge, MA,

02139, USA). Chemistry of Materials, 10(12), 3895-3901 (English)

1998. CODEN: CMATEX. ISSN: 0897-4756. Publisher: American

Chemical Society.

AB Thin films of silicon-contg. polymers were studied to investigate changes in surface compn. and morphol. on exposure to an oxygen plasma. For low mol. wt. poly(pentamethyldisilylstyrene) (P(PMDSS)), a reticulated structure was obsd. by at. force microscopy (AFM) that could limit future lithog. applications of these materials. The reticulations were of approx. 1  $\mu$ m in width and 5  $\mu$ m in length, though a higher mol. wt. polymer resulted in smaller feature sizes. In polysilane polymers contg. silicon in the backbone and mol. wts. significantly larger than the entanglement mol. wt., the feature dimensions were even smaller. Films etched at lower temp. (0 °C) displayed none of the reticulated morphol., retaining instead the smooth appearance of pre-etched films. It was found by XPS (XPS) and Auger electron spectroscopy (AES) that a thin (<100 Å) layer of SiO<sub>x</sub> formed on the surface of all of the studied silicon-contg. polymer films. Appearance of the reticulated morphol. required the combined presence of heating, oxygen plasma, and silicon in the polymer. The reticulated structures are believed to result from the destabilization of the thin films as they undergo the transition from a nonpolar organosilane to a polar oxide.

IT 114442-02-3, Poly(pentamethyldisilylstyrene)

RL: PRP (Properties)

(morphol. of silicon-contg. polymer films on exposure to oxygen plasma)

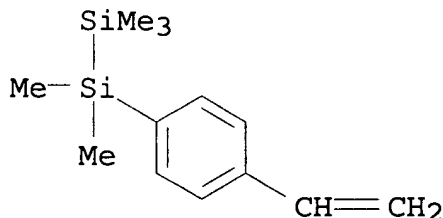
RN 114442-02-3 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

CMF C13 H22 Si2



CC 36-2 (Physical Properties of Synthetic High Polymers)  
Section cross-reference(s): 37

IT 31324-77-3, Dichloromethylphenylsilane homopolymer 76188-55-1,  
Dichlorophenylmethylsilane homopolymer, sru 114442-02-3,



Poly(pentamethyldisilylstyrene) 134708-62-6, Poly[methyl[4-(trimethylsilyl)phenyl]silylene] 134960-55-7

RL: PRP (Properties)

(morphol. of silicon-contg. polymer films on exposure to oxygen plasma)

L28 ANSWER 12 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN

1998:546187 Document No. 129:219965 Nanoporous ceramic coated structures from block copolymers. Chan, Vanessa Z.-H.; Thomas, Edwin L.; Lee, Victor; Miller, Robert D. (Dep. Mater. Sci. Eng., Massachusetts Inst. Technol., Cambridge, MA, USA). Polymeric Materials Science and Engineering, 79, 19-20 (English) 1998. CODEN: PMSDGG. ISSN: 0743-0515. Publisher: American Chemical Society.

AB The prepn. of 3-dimensional SiO<sub>x</sub> ceramic nanostructures from a silicon-contg. block copolymer precursor is presented. The block copolymer is converted to ceramic by a combination of ozone and O<sub>2</sub>-reactive ion etching. The advantages of this material over others is the potential to be converted to a ceramic due to the silicon present in the pentamethyldisilylstyrene, [P(PMDSS)] block. Since the silicon is intrinsically present in the monomer, the etch selectivity is also intrinsic in the block copolymer, so no post-polymn. chem. is necessary.

IT 207858-38-6D, triblock

RL: PEP (Physical, engineering or chemical process); PROC (Process) (nanoporous SiO<sub>x</sub> ceramic structures from block copolymers)

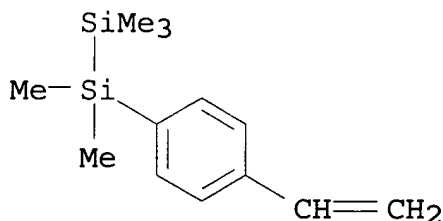
RN 207858-38-6 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, polymer with 2-methyl-1,3-butadiene, block (9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

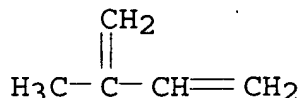
CMF C13 H22 Si2



CM 2

CRN 78-79-5

CMF C5 H8



CC 57-2 (Ceramics)

Section cross-reference(s): 38

IT 207858-38-6D, triblock

RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(nanoporous SiO<sub>x</sub> ceramic structures from block copolymers)

L28 ANSWER 13 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN

1998:516485 Document No. 129:109392 Synthesis and Morphological Behavior of Silicon-Containing Triblock Copolymers for Nanostructure Applications. Avgeropoulos, Apostolos; Chan, Vanessa Z-H.; Lee, Victor Y.; Ngo, Don; Miller, Robert D.; Hadjichristidis, Nikos; Thomas, Edwin L. (Department of Chemistry, University of Athens, Athens, 157 71, Greece). Chemistry of Materials, 10(8), 2109-2115 (English) 1998. CODEN: CMATEX. ISSN: 0897-4756. Publisher: American Chemical Society.

AB The synthesis of high-mol.-wt. triblock copolymers of the type ABA and BAB, where A is polyisoprene (PI) and B is poly(pentamethyldisilylstyrene) (P(PMDSS)), resp., is reported. The vol. fraction of the minority component (PI) for the ABA copolymer was 0.33, while that for the BAB copolymer was 0.23. The synthesis procedure of the P(PMDSS) blocks corresponded to that of polystyrene (PS), and low polydispersity with targeted compns. were achieved. The morphol. of the triblock copolymers was characterized by transmission electron microscopy (TEM) and digital Fourier transform patterns. From TEM and diffraction anal., the ABA polymer exhibited the double gyroid cubic morphol., while the BAB polymer showed a P(PMDSS) spherical domain morphol. The double gyroid morphol. is the first to be reported in a Si-contg. block copolymer and consists of 2 3-dimensionally continuous, interpenetrating but nonintersecting networks of PI in a matrix of P(PMDSS). Preliminary oxidative studies using ozone or O-reactive ion etching on the tricontinuous phase show that nanoporous structures can be generated.

IT 114442-01-2, p-(Pentamethyldisilyl)styrene

114442-02-3, p-(Pentamethyldisilyl)styrene homopolymer

207858-38-6, Isoprene-p-(pentamethyldisilyl)styrene block copolymer 845821-83-2

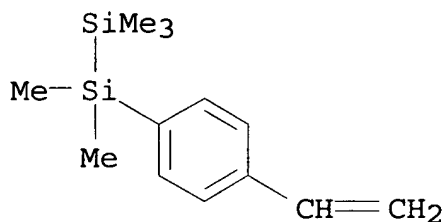
RL: RCT (Reactant); RACT (Reactant or reagent)

(starting material; synthesis and morphol. behavior of silicon-contg. triblock copolymers for nanostructure

applications)

RN 114442-01-2 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl- (9CI) (CA INDEX NAME)



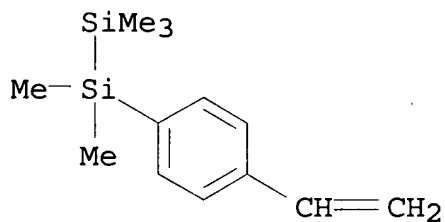
RN 114442-02-3 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

CMF C13 H22 Si2



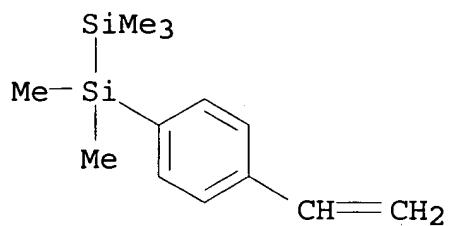
RN 207858-38-6 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, polymer with 2-methyl-1,3-butadiene, block (9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

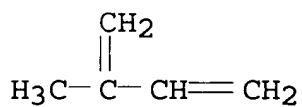
CMF C13 H22 Si2



CM 2

CRN 78-79-5

CMF C5 H8



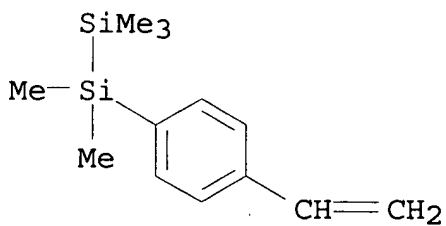
RN 845821-83-2 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, polymer with  
2-methyl-1,3-butadiene, triblock (9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

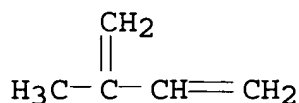
CMF C13 H22 Si2



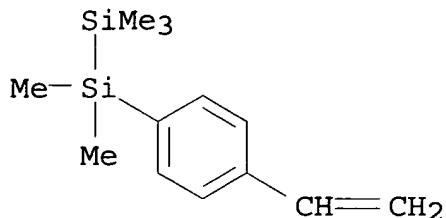
CM 2

CRN 78-79-5

CMF C5 H8



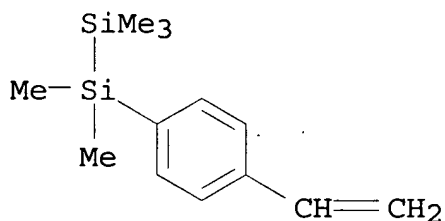
- CC 35-8 (Chemistry of Synthetic High Polymers)  
Section cross-reference(s): 36
- IT 1073-67-2, p-Chlorostyrene 1560-28-7, Chloropentamethyldisilane  
9003-31-0, Polyisoprene **114442-01-2**, p-  
(Pentamethyldisilyl)styrene **114442-02-3**,  
p-(Pentamethyldisilyl)styrene homopolymer **207858-38-6**,  
Isoprene-p-(pentamethyldisilyl)styrene block copolymer  
**845821-83-2**  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(starting material; synthesis and morphol. behavior of  
silicon-contg. triblock copolymers for nanostructure  
applications)
- L28 ANSWER 14 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN  
1995:715700 Document No. 123:112916 Polymerization of monomers  
containing functional silyl groups. 12. Anionic polymerization of  
styrene derivatives para-substituted with pentamethyldisilyl  
(Si-Si), heptamethyltrisilyl (Si-Si-Si), and nonamethyltetrasilyl  
(Si-Si-Si-Si) groups. Hirao, Akira; Ando, Yushi; Nakahama, Seiichi  
(Department Polymer Chemistry, Tokyo Institute Technology, Tokyo,  
152, Japan). Macromolecular Symposia, 95(Synthesis of Controlled  
Polymeric Structures through Living Polymerizations and Related  
Processes), 293-301 (English) 1995. CODEN: MSYMEC. ISSN:  
1022-1360. Publisher: Huethig & Wepf.
- AB Anionic homo- and copolymn. of the title monomers was investigated.  
The pentamethyldisilyl (I) and heptamethyltrisilyl (II) derivs.  
homopolymerize to give stable living polymers. Block copolymers  
with well-defined structures were prepd. by sequential addn. of I or  
II and styrene. Polymn. did not occur with the nonamethyltetrasilyl  
deriv.
- IT **114442-02-3P**, p-(Pentamethyldisilyl)styrene homopolymer  
**166534-24-3P**, p-(Pentamethyldisilyl)styrene-styrene block  
copolymer  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. by anionic living polymn.)
- RN 114442-02-3 HCAPLUS
- CN Disilane, (4-ethenylphenyl)pentamethyl-, homopolymer (9CI) (CA  
INDEX NAME)
- CM 1
- CRN 114442-01-2
- CMF C13 H22 Si2



RN 166534-24-3 HCAPLUS  
 CN Disilane, (4-ethenylphenyl)pentamethyl-, polymer with  
 ethenylbenzene, block (9CI) (CA INDEX NAME)

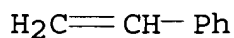
CM 1

CRN 114442-01-2  
 CMF C13 H22 Si2



CM 2

CRN 100-42-5  
 CMF C8 H8



CC 35-4 (Chemistry of Synthetic High Polymers)  
 IT 114442-02-3P, p-(Pentamethyldisilyl)styrene homopolymer  
 116695-43-3P, p-(Heptamethyltrisilyl)styrene homopolymer  
 166534-24-3P, p-(Pentamethyldisilyl)styrene-styrene block  
 copolymer 166534-25-4P, p-(Heptamethyltrisilyl)styrene-styrene  
 block copolymer  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (prepn. by anionic living polymn.)

L28 ANSWER 15 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN  
 1992:42182 Document No. 116:42182 Photodegradation and  
 electron-beam-induced degradation of poly[(pentamethyldisilyl)styren  
 e sulfones]. Watanabe, Akira; Sakakibara, Taro; Ito, Seiki; Ono,  
 Hiroshi; Yoshida, Youichi; Tagawa, Seiichi; Matsuda, Minoru (Inst.  
 Chem. React. Sci., Tohoku Univ., Sendai, 980, Japan).  
 Macromolecules, 25(2), 692-7 (English) 1992. CODEN: MAMOBX. ISSN:  
 0024-9297.

AB Photodegrdn. and electron-beam-induced degrdn. of  
 p-(pentamethyldisilyl)styrene (I)-SO<sub>2</sub> copolymer (II) **resist**  
 materials were investigated by flash and pulse radiolysis  
 techniques. The transient absorption spectra obtained by the flash  
 photolysis for a soln. of nonalternating II in THF showed the  
 formation of a benzyl radical as a transient intermediate. On the  
 other hand, the transient absorption spectra for an alternating II  
 did not show the absorption of a benzyl radical but showed that of  
 I. The decay curve for an alternating II exhibited fast  
 depropagation after the flash photolysis. The disilyl bond in II  
 dissocd. easily by photolysis whereas the bond was stable under  
 electron-beam irradiation. The transient absorption spectra of a radical  
 anion of the sulfonyl groups was obsd. by pulse radiolysis for a  
 soln. of II in THF.

IT 123361-83-1 137823-89-3

RL: USES (Uses)

(**resists**, photochem. and electron beam degrdn. of)

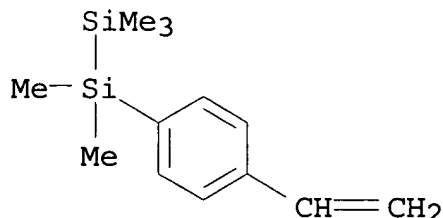
RN 123361-83-1 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, polymer with sulfur dioxide  
 (9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

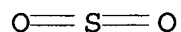
CMF C13 H22 Si2



CM 2

CRN 7446-09-5

CMF 02 S



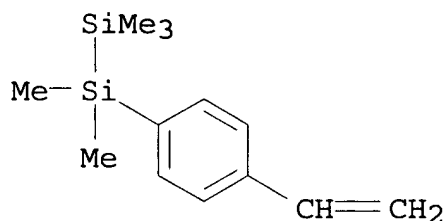
RN 137823-89-3 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, polymer with sulfur dioxide, alternating (9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

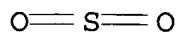
CMF C13 H22 Si2



CM 2

CRN 7446-09-5

CMF 02 S



CC 35-8 (Chemistry of Synthetic High Polymers)

Section cross-reference(s): 74

ST polystyrene silyl deriv polysulfone **resist**; photodegrdn  
silylated polystyrene polysulfone; electron beam degrdn polystyrene  
polysulfone

IT Polysulfones, properties

RL: USES (Uses)

(resists, photochem. and electron beam degrdn. of)

IT **Resists**(electron-beam, (pentamethyldisilyl)styrene-sulfur dioxide  
copolymers, degrdn. mechanism of)IT **Resists**



(photo-, (pentamethyldisilyl)styrene-sulfur dioxide copolymers,  
degrdn. mechanism of)

IT 123361-83-1 137823-89-3

RL: USES (Uses)

(**resists**, photochem. and electron beam degrdn. of)

L28 ANSWER 16 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN

1991:546437 Document No. 115:146437 Evaluation of poly(p-trimethylsilylstyrene sulfone) and poly(p-pentamethyldisilylstyrene sulfone) as high-resolution electron-beam **resists**. Gozdz, Antoni S.; Ono, Hiroshi; Ito, Seiki; Shelburne, John A., III; Matsuda, Minoru (Bellcore, Red Bank, NJ, 07701, USA). Proceedings of SPIE-The International Society for Optical Engineering, 1466 (Adv. Resist Technol. Process. 8), 200-5 (English) 1991. CODEN: PSISDG. ISSN: 0277-786X.

AB Sol. 1:1 alternating copolymers of poly(p-trimethylsilylstyrene sulfone) (I) and poly(p-pentamethyldisilylstyrene sulfone) were synthesized by free-radical copolymerization at  $T < -50^\circ$ . Both copolymers had very high mol. wts. and exhibited good film-forming properties. Their thermal stability in N (5% wt loss) was ca. 210-230°. The etch rate under O<sub>2</sub> RIE conditions (15 millitorr O<sub>2</sub>, -400 V) was 3.4 and 2.5 nm/min, and their electron beam sensitivity was 3 and 6  $\mu\text{C}/\text{cm}^2$  at 20 and 50 kV, resp., using a 40/60 vol./vol. toluene/2-propanol soln. as the developer; 200-nm-pitch gratings for advanced optoelectronic devices were fabricated in various planarizing materials and InP using I as a top imaging layer.

IT 123361-83-1, Poly(p-pentamethyldisilylstyrene sulfone)

RL: USES (Uses)

(electron-beam **resist** from, for submicron  
**lithog.**)

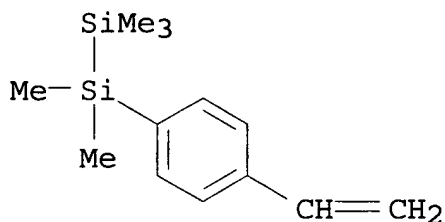
RN 123361-83-1 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, polymer with sulfur dioxide  
(9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

CMF C13 H22 Si2



CM 2

CRN 7446-09-5

CMF 02 S

O=S=O

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

ST methylsilylstyrene polymer electron **resist**; sulfone  
methylsilylstyrene polymer electron **resist**

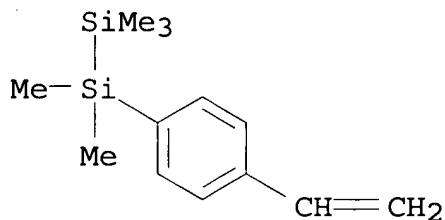
IT **Resists**  
(electron-beam, poly(trimethylsilylstyrene sulfone) and poly(pentamethyldisilylstyrene sulfone) as, for high-resoln. submicron **lithog.**)

IT 113032-02-3, Poly(p-trimethylsilylstyrene sulfone)  
**123361-83-1**, Poly(p-pentamethyldisilylstyrene sulfone)  
RL: USES (Uses)  
(electron-beam **resist** from, for submicron **lithog.**)

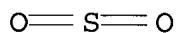
L28 ANSWER 17 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN  
1991:460647 Document No. 115:60647 **Lithographic** properties of alternating copolymers of linear and cyclic alkenyldisilanes and silylated styrenes with sulfur dioxide. Gozdz, A. S.; Shelburne, J. S.; Bowden, M. J.; Ito, S.; Matsuda, M. (Bellcore, Red Bank, NJ, 07701, USA). Polymeric Materials Science and Engineering, 64, 23-4 (English) 1991. CODEN: PMSEDG. ISSN: 0743-0515.

AB In an effort to improve the processing characteristics of Si contg. polymers, several **resists** were prepd. by radical alternating copolymn. of both linear and cyclic alkenyl(di)silanes with sulfur dioxide. Results are presented on the effect of increasing the Si content in the side-chain on the soly. characteristics to permit greater flexibility in choice of developer and eliminate the need for an initial surface passivation.

IT 123361-83-1  
 RL: USES (Uses)  
 (soly. characteristics of, as lithog. resist material)  
 RN 123361-83-1 HCAPLUS  
 CN Disilane, (4-ethenylphenyl)pentamethyl-, polymer with sulfur dioxide (9CI) (CA INDEX NAME)  
 CM 1  
 CRN 114442-01-2  
 CMF C13 H22 Si2



CM 2  
 CRN 7446-09-5  
 CMF 02 S



CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)  
 ST lithog alkenyldisilane sulfur dioxide polymer;  
 resist alkenyldisilane sulfur dioxide polymer  
 IT Resists  
 (polymeric, soly. characteristics of alternating copolymers of linear and cyclic alkenyl disilanes and silylated styrenes with sulfur dioxide as)  
 IT 113032-02-3 123361-83-1 134900-65-5 134900-67-7  
 134900-68-8 134900-69-9 134900-71-3 134900-73-5 134900-74-6  
 134900-75-7 134900-76-8  
 RL: USES (Uses)  
 (soly. characteristics of, as lithog. resist material)

L28 ANSWER 18 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN

1991:24645 Document No. 114:24645 Flash photolysis study of initiation step in radical polymerization of silicon-containing vinyl monomers: reactivities to arylthiyl radicals. Saito, Hidenao; Ito, Osamu; Matsuda, Minoru (Chem. Res. Inst. Non-Aqueous Solutions, Tohoku Univ., Sendai, 980, Japan). Polymer, 31(10), 1986-90 (English) 1990. CODEN: POLMAG. ISSN: 0032-3861.

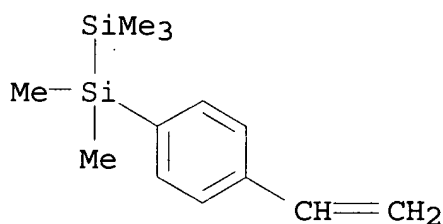
AB The initiation steps in radical polymn. of Si-contg. vinyl monomers with  $\text{ArS}\cdot$  were studied by the flash photolysis method. Rate consts. for reversible addn. reactions of  $\text{ArS}\cdot$  with various Si-contg. vinyl monomers were detd. by the selective radical scavenging method. For each  $\text{ArS}\cdot$ , the reactivities for  $\text{CH}_2=\text{CHX}$  increased in the order:  $\text{X} = -\text{C}(\text{CH}_3)_3 < -(\text{CH}_2)_3\text{CH}_3 < -\text{CH}_2\text{Si}(\text{OCH}_3)_3 \leq -\text{CH}_2\text{Si}(\text{CH}_3)_3 \approx -\text{Si}(\text{OCH}_3)_3 \approx -\text{Si}(\text{CH}_3)_3 \ll -\text{C}_6\text{H}_4\text{Si}(\text{CH}_3)_3\text{-p} \approx -\text{C}_6\text{H}_4\text{Si}(\text{CH}_3)_2\text{Si}(\text{CH}_3)_3\text{-p}$ . The reactivity of the C=C bond was increased by the substitution of the Si atom at vinyl and allyl positions. The polar and resonance factors of Si-contg. monomers were evaluated from the kinetic data, which were compared with the Alfrey-Price Q-e scheme obtained from the copolymn. data.

IT 114442-01-2

RL: RCT (Reactant); RACT (Reactant or reagent)  
(polymn. of, kinetics of, arylthiyl catalysts in relation to)

RN 114442-01-2 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl- (9CI) (CA INDEX NAME)



CC 35-3 (Chemistry of Synthetic High Polymers)

IT 80-62-6, Methyl methacrylate 558-37-2, 3,3-Dimethyl-1-butene  
592-41-6, 1-Hexene, reactions 754-05-2, Trimethylsilylethylene  
762-72-1, 3-(Trimethylsilyl)-1-propene 1009-43-4,  
p-Trimethylsilylstyrene 1746-23-2 2551-83-9 2768-02-7  
114442-01-2

RL: RCT (Reactant); RACT (Reactant or reagent)  
(polymn. of, kinetics of, arylthiyl catalysts in relation to)

L28 ANSWER 19 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN

1989:584218 Document No. 111:184218 Polyalkylpolysilylstyrene-sulfur dioxide copolymers for positive-working resists. Matsuda,

Minoru; Ito, Seiju; Ono, Hiroshi (Chisso Corp., Japan). Jpn. Kokai Tokkyo Koho JP 01131246 A2 19890524 Heisei, 6 pp. (Japanese).  
CODEN: JKXXAF. APPLICATION: JP 1987-289133 19871116.

AB Pos.-working **resists** with good dry etching resistance contain linear copolymers [no. av. mol. wt. (Mn) 2000-2,000,000] contg. 1-50 mol% SO<sub>2</sub> unit and 50-99 mol% CH<sub>2</sub>:CH(C<sub>6</sub>H<sub>4</sub>Si<sub>p</sub>R<sub>2p+1</sub>) (R = lower alkyl; p = 2-5) units. Thus, 15.1 g p-pentamethyldisilylstyrene and 20.2 g SO<sub>2</sub> were polymd. in presence of Me<sub>3</sub>COOH at -50° for 24 h to give 4.4 g alternating polymer (I) with Mn 349,000 and glass transition point 164°. A Si wafer was coated with a soln. of I in cyclohexanone and prebaked to give a **resist** with electron beam sensitivity 3 + 10<sup>-6</sup> C/cm<sup>2</sup> and UV sensitivity 30 mJ/cm<sup>2</sup>.

IT 123361-83-1

RL: USES (Uses)

(**resists**, with good dry etching resistance)

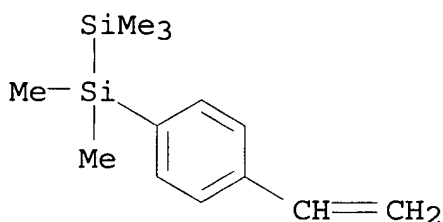
RN 123361-83-1 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, polymer with sulfur dioxide (9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

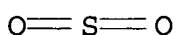
CMF C13 H22 Si2



CM 2

CRN 7446-09-5

CMF 02 S



IC ICM C08G075-02

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

Section cross-reference(s): 35

ST alkylsilylstyrene copolymer sulfur oxide **resist**; styrene alkylsilyl copolymer sulfur dioxide; pos working **resist** styrene polymer

IT **Resists**

(electron-beam, pos.-working, (polyalkylpolysilyl)styrene-sulfur dioxide copolymers as)

IT **Resists**

(photo-, pos.-working, (polyalkylpolysilyl)styrene-sulfur dioxide copolymers as)

IT **123361-83-1**

RL: USES (Uses)

(**resists**, with good dry etching resistance)

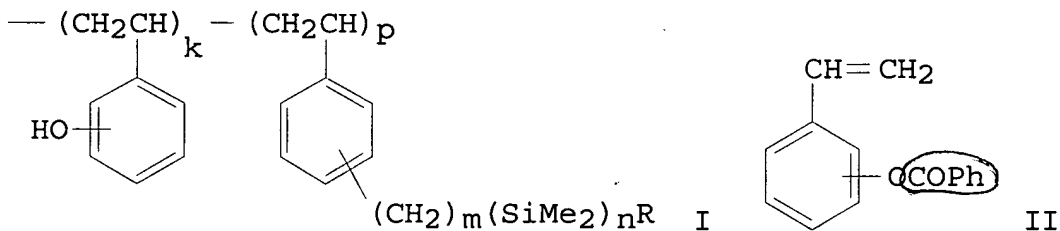
L28 ANSWER 20 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN

1989:564245 Document No. 111:164245 **Resists**, and pattern

formation using the same. Gokochi, Tooru; Tada, Tsukasa; Watanabe, Haruaki (Toshiba Corp., Japan). Jpn. Kokai Tokkyo Koho JP 01088446 A2 19890403 Heisei, 11 pp. (Japanese). CODEN: JKXXAF.

APPLICATION: JP 1987-245402 19870929.

GI



AB The title **resists** mainly consists of copolymers I ( $R = Me$ , allyl, vinyl;  $k, p \geq 1$ ;  $m = 0 - 2$ ;  $n = 1-3$ ). Pattern formation involves formation of a polymer layer on substrates, coating with a layer of the above **resist**, exposure, and development to form upper **resist** pattern, and dry etching in O plasma. These **resists** are highly sensitive to radiations and provide patterns by development with alkali solns. with suppressed swelling, and are suitable for pattern formation by bilevel **resists**. Thus, a monomer II was copolymd. with p-trimethylsilylstyrene (from 4-chlorostyrene, by Grignard reaction) in 2:1 ratio, and hydrolyzed at the ester group. Etching rate of a layer of this copolymer on Si wafer by O plasma was 38.7 Å/min, when a novolak **resist** was etched at a rate 240 Å/min. A bilevel **resist** having an OFPR800 (novolak) **resist** layer and an invention **resist** layer contg.

4,4'-diazidodiphenylsulfone gave pattern resolving 0.25- $\mu$ m lines, using electron beam for patterning (with sensitivity 27  $\mu$ C/cm<sup>2</sup>) and 5% Me<sub>4</sub>NOH as developer.

IT 122953-17-7D, hydrolyzed 122953-22-4D, hydrolyzed

RL: USES (Uses)

(as **resist** layer, for high etching resistance)

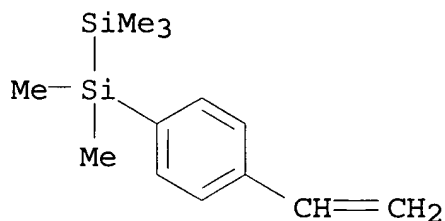
RN 122953-17-7 HCAPLUS

CN Phenol, 4-ethenyl-, benzoate, polymer with (4-ethenylphenyl)pentamethyldisilane (9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

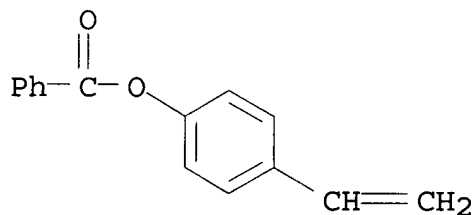
CMF C13 H22 Si2



CM 2

CRN 32568-59-5

CMF C15 H12 O2



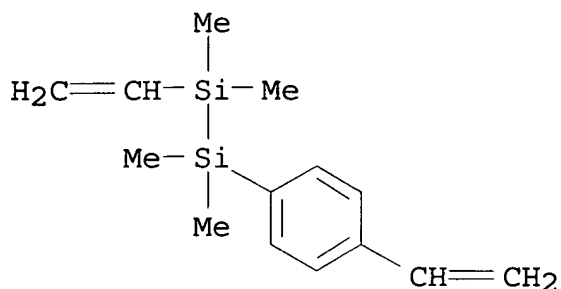
RN 122953-22-4 HCAPLUS

CN Phenol, 4-ethenyl-, benzoate, polymer with 1-ethenyl-2-(4-ethenylphenyl)-1,1,2,2-tetramethyldisilane (9CI) (CA INDEX NAME)

CM 1

CRN 122953-21-3

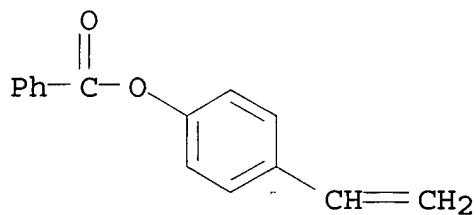
CMF C14 H22 Si2



CM 2

CRN 32568-59-5

CMF C15 H12 O2



- IC ICM G03C001-71  
ICS G03C001-71; G03C001-72; G03F007-08
- ICA H01L021-30
- CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)  
Section cross-reference(s): 38
- ST **photoresist** bilevel silicon contg polystyrene;  
**resist** electron novolak etching resistant
- IT **Resists**  
(electron-beam, polystyrene, silane group-contg., for high resistance to etching)
- IT **Resists**  
(photo-, polystyrene, silane group-contg., for high resistance to etching)
- IT 593-60-2, Vinyl bromide  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(Grignard reaction of, with disilane deriv., polymers for **resists** from)
- IT 1073-67-2  
RL: RCT (Reactant); RACT (Reactant or reagent)



(Grignard reaction of, with silanes, polymers for **resists** from)

- IT 122953-15-5D, hydrolyzed 122953-16-6D, hydrolyzed  
122953-17-7D, hydrolyzed 122953-19-9D, hydrolyzed  
122953-20-2D, hydrolyzed 122953-22-4D, hydrolyzed  
RL: USES (Uses)  
(as **resist** layer, for high etching resistance)
- IT 4342-61-4P  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation);  
RACT (Reactant or reagent)  
(prepn. and reaction of, with Grignard product of vinyl bromide,  
polymers for **resists** from)
- IT 106620-28-4P  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation);  
RACT (Reactant or reagent)  
(prepn. and reaction of, with bromophenol, polymers for  
**resists** from)
- IT 75-77-4, Trimethylchlorosilane, reactions 1560-28-7  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(reaction of, with Grignard product of chlorostyrene, polymers  
for **resists** from)
- IT 812-15-7, Pentamethyldisilane  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(reaction of, with divinylbenzene, polymers for **resists**  
from)
- IT 1321-74-0, Divinylbenzene, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(reaction of, with pentamethyldisilane, polymers for  
**resists** from)
- IT 106-41-2  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(reaction of, with vinylidisilane deriv., polymers for  
**resists** from)

L28 ANSWER 21 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN  
1989:515808 Document No. 111:115808 Radical polymerizations of  
4-pentamethyldisilylstyrenes. Saigo, Kazuhide (Opto-Electron. Res.  
Lab., NEC Corp., Kawasaki, 213, Japan). Journal of Polymer Science,  
Part A: Polymer Chemistry, 27(7), 2203-16 (English) 1989. CODEN:  
JPACEC. ISSN: 0887-624X.

AB Radical polymns. of 4-pentamethyldisilylstyrene (I) and  
4-pentamethyldisilyl- $\alpha$ -methylstyrene (II) were conducted.  
Monomer reactivity ratios ( $r_1$  and  $r_2$ ) of I or II with styrene (M1)  
were measured with Fineman-Ross plots. The resonance factor (Q) and  
polar factor (e) of a Q-e scheme for I were calcd. with the  $r_1$  and  
 $r_2$  values. The inductive effect ( $\sigma_I$ ) and resonance effect  
( $\sigma_R$ ) of the pentamethyldisilyl group were monitored with the  
 $^1H$ - and  $^{13}C$ -NMR spectra of I. The magnitudes of  $\sigma_I$  and

use  
24/25

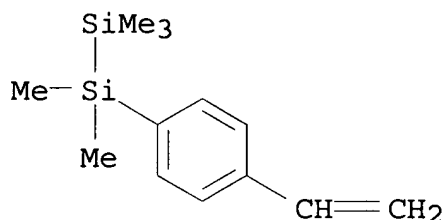
$\sigma$ R0 were analogous to those of the trimethylsilyl group, indicating that the disilyl group shows a net electron-withdrawal effect.

IT 114442-01-2

RL: RCT (Reactant); RACT (Reactant or reagent)  
(polymn. of, with styrene, reactivity ratio and Qe value in)

RN 114442-01-2 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl- (9CI) (CA INDEX NAME)



IT 114442-02-3P 122551-14-8P 122551-15-9P

RL: PRP (Properties); SPN (Synthetic preparation); PREP  
(Preparation)  
(prepn. and glass temp. of)

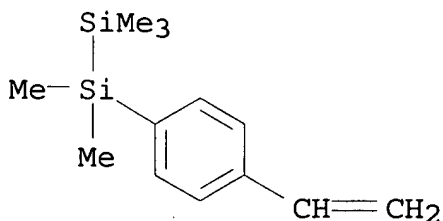
RN 114442-02-3 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

CMF C13 H22 Si2

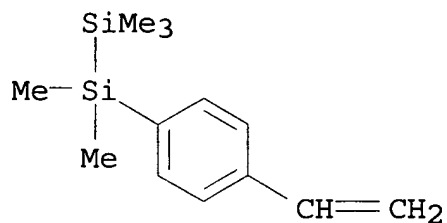


RN 122551-14-8 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, polymer with ethenylbenzene  
(9CI) (CA INDEX NAME)

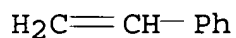
CM 1

CRN 114442-01-2  
CMF C13 H22 Si2



CM 2

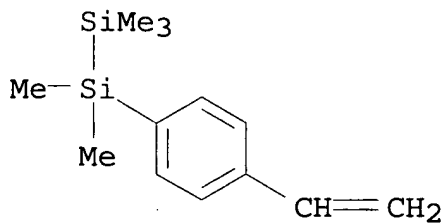
CRN 100-42-5  
CMF C8 H8



RN 122551-15-9 HCAPLUS  
CN Disilane, (4-ethenylphenyl)pentamethyl-, polymer with  
1-(chloromethyl)-4-ethenylbenzene (9CI) (CA INDEX NAME)

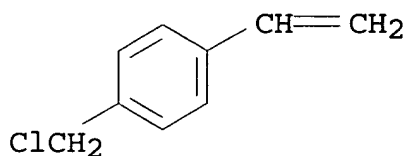
CM 1

CRN 114442-01-2  
CMF C13 H22 Si2



CM 2

CRN 1592-20-7  
CMF C9 H9 Cl



CC 35-3 (Chemistry of Synthetic High Polymers)

IT 114442-01-2 122551-16-0

RL: RCT (Reactant); RACT (Reactant or reagent)  
(polymn. of, with styrene, reactivity ratio and  $Q_e$  value in)

IT 114442-02-3P 122551-14-8P 122551-15-9P  
122551-17-1P

RL: PRP (Properties); SPN (Synthetic preparation); PREP  
(Preparation)  
(prepn. and glass temp. of)

L28 ANSWER 22 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN

1988:550442 Document No. 109:150442 Polystyrenes with  
p-oligo-siloxane, silane, germanosiloxane, germane, or stannane as  
p-substituents as materials for oxygen permeable membranes.  
Kawakami, Yuhstake; Hisada, Hirofumi; Yamashita, Yuya (Nagoya Univ.,  
Nagoya, 464, Japan). Journal of Polymer Science, Part A: Polymer  
Chemistry, 26(5), 1307-14 (English) 1988. CODEN: JPACEC. ISSN:  
0887-624X.

AB The title polymers were synthesized and the  $O_2$  permeability ( $PO$ )  
through the polymer films was studied. The oligodimethylsilane-  
substituted polystyrenes showed a low  $PO$  compared with the  
oligodimethylsiloxane-substituted polystyrene. The important role  
of trimethylsiloxyl group in permeation was suggested.

IT 114442-02-3P

RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. and oxygen permeability of)

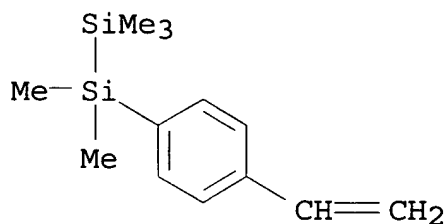
RN 114442-02-3 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, homopolymer (9CI) (CA  
INDEX NAME)

CM 1

CRN 114442-01-2

CMF C13 H22 Si2

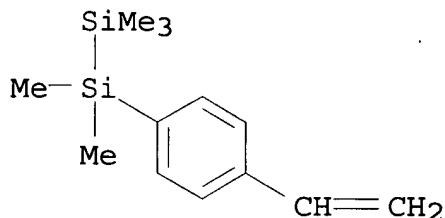


IT 114442-01-2P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation);  
 RACT (Reactant or reagent)  
 (prepn. and polymn. of)

RN 114442-01-2 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl- (9CI) (CA INDEX NAME)



CC 36-5 (Physical Properties of Synthetic High Polymers)

Section cross-reference(s): 38

IT 114442-02-3P 116695-24-0P 116695-25-1P 116695-27-3P  
 116695-28-4P 116695-30-8P 116695-31-9P 116695-32-0P  
 116695-34-2P 116695-36-4P 116695-39-7P 116695-43-3P

RL: SPN (Synthetic preparation); PREP (Preparation)  
 (prepn. and oxygen permeability of)

IT 1009-40-1P, 4-Trimethylgermylstyrene 1009-50-3P 64268-26-4P  
 64268-27-5P 114442-01-2P 114975-45-0P 116410-55-0P  
 116695-26-2P 116695-29-5P 116695-33-1P 116695-35-3P  
 116695-38-6P 116695-41-1P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation);  
 RACT (Reactant or reagent)  
 (prepn. and polymn. of)

L28 ANSWER 23 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN

1988:464346 Document No. 109:64346 UV photoresist containing  
 allylsilylsilylstyrene polymer for bilayer pattern formation.  
 Saito, Kazuhide (NEC Corp., Japan). Jpn. Kokai Tokkyo Koho JP  
 62296139 A2 19871223 Showa, 6 pp. (Japanese). CODEN: JKXXAF.  
 APPLICATION: JP 1986-140546 19860616.

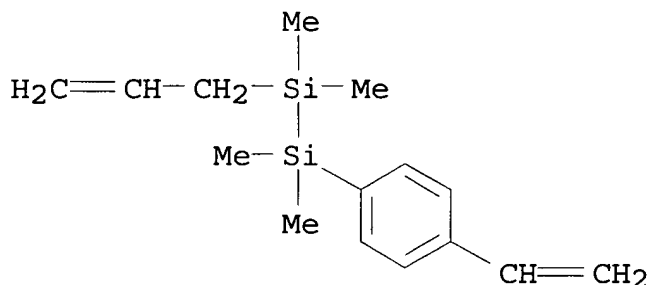
AB A Si-contg. styrene polymer provides an UV **photoresist** with improved resistance to dry etching suitable for use in producing high-resoln. bilayer **resist** patterns. The polymer is a 4-allyl(dimethylsilyl)nstyrene polymer ( $n \geq 2$ ) having a mol. wt. 3000-106 and may be poly(4-allyldimethylsilyldimethylsilylstyrene). An UV **photoresist** contains the Si-contg. styrene polymer and a bisazide. It may also be used as an electron-beam **resist**. A pattern prepd. from the **photoresist** is then used as a dry-etching **mask** for producing a bilayer **resist** pattern.

IT **115324-70-4P**

RL: RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent) (prepn. and polymn. of, for prepg. UV **photoresists**)

RN 115324-70-4 HCAPLUS

CN Disilane, 1-(4-ethenylphenyl)-1,1,2,2-tetramethyl-2-(2-propenyl)-(9CI) (CA INDEX NAME)



IT **115324-71-5P**

RL: SPN (Synthetic preparation); PREP (Preparation) (prepn. and use of, as electron-beam **resist** and UV **photoresist**)

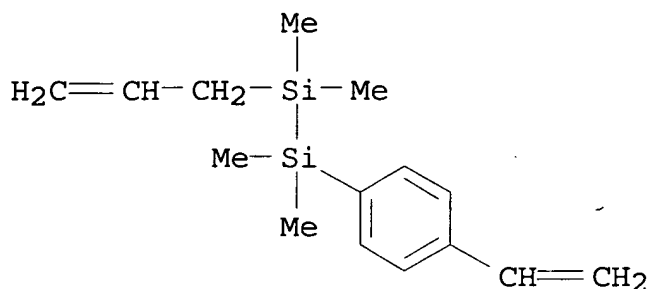
RN 115324-71-5 HCAPLUS

CN Disilane, 1-(4-ethenylphenyl)-1,1,2,2-tetramethyl-2-(2-propenyl)-, homopolymer (9CI) (CA INDEX NAME)

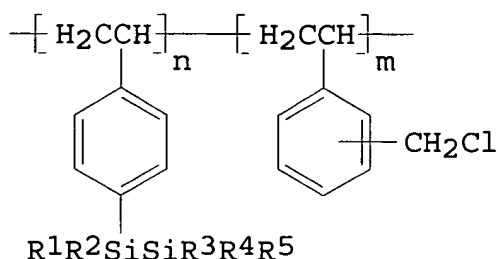
CM 1

CRN 115324-70-4

CMF C15 H24 Si2



- IC ICM G03C001-71  
ICS C08F012-14; C08F012-34; C08K005-28; C08L025-18; G03C001-71  
ICA C09D003-74  
CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)  
ST UV **photoresist** polyallylsilylsilylstyrene bilayer pattern  
IT **115324-70-4P**  
RL: RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)  
(prepn. and polymn. of, for prepg. UV **photoresists**)
- IT **115324-71-5P**  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. and use of, as electron-beam **resist** and UV **photoresist**)
- IT 1450-14-2, Hexamethyldisilane 4342-61-4, 1,2-  
Dichlorotetramethyldisilane 10124-62-6, 1,2-  
Dimethoxytetramethyldisilane 115007-15-3  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(reaction of, in prepn. of allylsilylsilylstyrene for **photoresist**)
- IT 1073-67-2, 4-Chlorostyrene  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(reaction of, with allylmethoxymethyldisilane in prepn. of allylsilylsilylstyrene for **photoresist**)
- L28 ANSWER 24 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN  
1988:213981 Document No. 108:213981 **Resist** materials and  
pattern formation method. Watanabe, Fumitake (NEC Corp., Japan).  
Jpn. Kokai Tokkyo Koho JP 62280839 A2 19871205 Showa, 4 pp.  
(Japanese). CODEN: JKXXAF. APPLICATION: JP 1986-126591 19860530.
- GI



AB The copolymers I (R1-5 = H, lower alkyl) are used as the title **resist** materials. The title method involves coating a substrate with a polymer layer and with the **resist** material, **lithog.** patterning of the **resist** layer and dry etching of the polymer layer. The **resist** is resistant to dry etching and provides good pattern reprodn. Thus, a monomer was prepd. by Grignard reaction of p-chlorostyrene and reaction with chloropentamethyldisilane. A polymer having wt.-av. mol. wt. 105,000 was obtained by the addn. polymn. of chloromethylated styrene and the above monomer. A Si substrate coated with a 1.5- $\mu$  layer of MP-1300 ( **resist**) was overcoated with the soln. of the above polymer to form a 0.3- $\mu$  layer, and was patterned with electron beam. Etching of the developed material gave well-reproduced pattern.

IT 114465-16-6

RL: USES (Uses)

(radiation-sensitive **resist**, dry etching-resistant)

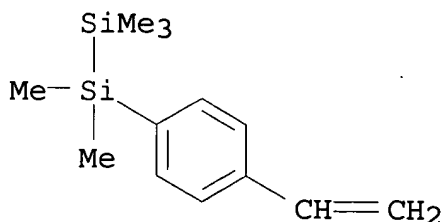
RN 114465-16-6 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, polymer with (chloromethyl)ethenylbenzene (9CI) (CA INDEX NAME)

CM 1

CRN 114442-01-2

CMF C13 H22 Si2



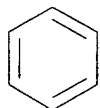


CM 2

CRN 30030-25-2

CMF C9 H9 Cl

CCI IDS



D1-CH<sub>2</sub>-Cl

D1-CH=CH<sub>2</sub>

IC ICM G03C001-71  
ICS G03C001-71; G03F007-10

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and  
Other Reprographic Processes)  
Section cross-reference(s): 76

ST **resist** radiation disilanylstyrene copolymer;  
chloromethylstyrene copolymer radiation **resist**

IT **Resists**  
(radiation-sensitive, disilanylstyrene copolymers as dry  
etching-resistant)

IT 101360-22-9, MP1300  
RL: USES (Uses)  
(as underlayer of **photoresist**)

IT 1450-14-2, Hexamethyldisilane  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(chlorination of, radiation-sensitive **resist** from)

IT 1560-28-7P, Chloropentamethyldisilane  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation);  
RACT (Reactant or reagent)  
(prepn. and reaction of, with p-chlorostyrene,  
radiation-sensitive **resist** from)

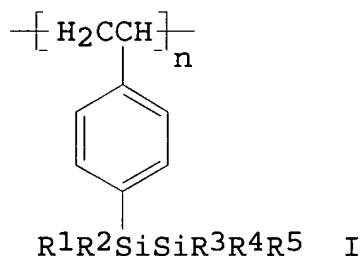
IT **114465-16-6**  
RL: USES (Uses)  
(radiation-sensitive **resist**, dry etching-resistant)

IT 1073-67-2, p-Chlorostyrene  
RL: USES (Uses)  
(reaction with chloropentamethyldisilane, radiation-sensitive

resist from)

L28 ANSWER 25 OF 25 HCAPLUS COPYRIGHT 2005 ACS on STN  
 1988:213980 Document No. 108:213980 **Resist** materials and  
 pattern formation method. Watanabe, Fumitake (NEC Corp., Japan).  
 Jpn. Kokai Tokkyo Koho JP 62280840 A2 19871205 Showa, 4 pp.  
 (Japanese). CODEN: JKXXAF. APPLICATION: JP 1986-126592 19860530.

GI



AB Disilanylstyrene polymers I (R1-5 = H, lower alkyl) are used as  
 title **resist** materials. The title method involves coating  
 of a substrate with a polymer layer and with the **resist**  
 material, **lithog.** patterning of the **resist**  
 layer, and dry etching of the polymer layer. The **resist**  
 is resistant to dry etching and provides good pattern reprodn.  
 Thus, a monomer was prepd. by Grignard reaction of p-chlorostyrene  
 and reaction with chloropentamethyldisilane. A polymer having  
 wt.-av. mol. wt. 52,000 was obtained by the polymn. of the above  
 monomer. A Si substrate coated with a layer of MP-1300 (  
**resist**) was overcoated with the soln. of the above polymer  
 and was patterned with electron beam. Etching of the MP-1300 layer  
 gave well-reproduced pattern.

IT 114442-02-3

RL: USES (Uses)

(radiation-sensitive **resist**, dry etching-resistant)

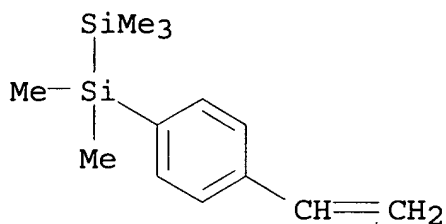
RN 114442-02-3 HCAPLUS

CN Disilane, (4-ethenylphenyl)pentamethyl-, homopolymer (9CI) (CA  
 INDEX NAME)

CM 1

CRN 114442-01-2

CMF C13 H22 Si2



IC ICM G03C001-71  
ICS G03C001-71; G03F007-10

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)  
Section cross-reference(s): 76

ST **resist** radiation disilanylstyrene polymer

IT **Resists**  
(radiation-sensitive, poly(disilanylstyrene) as dry etching-resistant)

IT 101360-22-9, MP1300  
RL: USES (Uses)  
(as underlayer of **photoresist**)

IT 1450-14-2, Hexamethyldisilane  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(chlorination of, radiation-sensitive **resist** from)

IT 1560-28-7P, Chloropentamethyldisilane  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
(prepn. and reaction of, with p-chlorostyrene, radiation-sensitive **resist** from)

IT **114442-02-3**  
RL: USES (Uses)  
(radiation-sensitive **resist**, dry etching-resistant)

IT 1073-67-2, p-Chlorostyrene  
RL: USES (Uses)  
(reaction with chloropentamethyldisilane, radiation-sensitive **resist** from)

=> d 130 1-44 cbib abs hitstr hitind

L30 ANSWER 1 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN  
2005:368438 Document No. 142:420058 Chemically amplified  
**resists** with high contrast on development and patterning  
thereof. Hatakeyama, Jun; Takeda, Takanobu (Shin-Etsu Chemical

Industry Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2005114968 A2  
20050428, 53 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP  
2003-348162 20031007.

AB The **resists** contain polymers of hydroxystyrene, hydroxyvinyl naphthalene, or hydroxyvinylanthracene wherein OH groups in the terminal repeating units are partially protected with acid-labile groups. The polymers may be prep'd. by living radical polymn. Chem. amplified pos. **resists** contg. the polymers as base resins, org. solvents, acid generators, and optionally dissoln. inhibitors and basic compds. are also claimed. The **resists** are pasted on substrates, prebaked, exposed to high energy beams or electron beams, (post-baked,) and developed to form fine patterns.

IT **850580-89-1DP**, hydrolyzed **850580-90-4DP**, hydrolyzed

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(**resists** contg. acid-labile polymers protected at hydroxy groups in terminal segments and showing high development contrast)

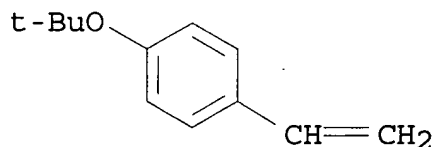
RN 850580-89-1 HCAPLUS

CN Silane, (4-ethenylphenyl)trimethyl-, polymer with 1-(1,1-dimethylethoxy)-4-ethenylbenzene, triblock (9CI) (CA INDEX NAME)

CM 1

CRN 95418-58-9

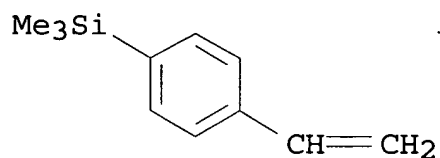
CMF C12 H16 O



CM 2

CRN 1009-43-4

CMF C11 H16 Si



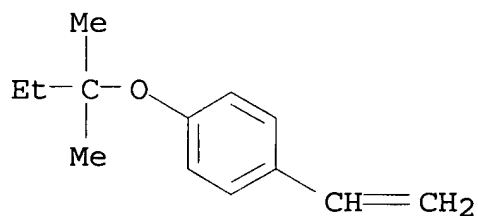
RN 850580-90-4 HCAPLUS

CN Silane, (4-ethenylphenyl)trimethyl-, polymer with  
1-(1,1-dimethylpropoxy)-4-ethenylbenzene, diblock (9CI) (CA INDEX  
NAME)

CM 1

CRN 146716-59-8

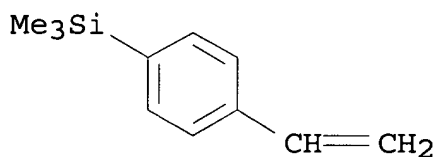
CMF C13 H18 O



CM 2

CRN 1009-43-4

CMF C11 H16 Si



IC ICM G03F007-039

ICS C08F012-02; G03F007-033

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and  
Other Reprographic Processes)  
Section cross-reference(s): 38

ST amplified **resist** terminal protected acid labile polymer;  
butoxystyrene trimethylsiloxystyrene triblock living polymd

amplified **resist**; terminal hydroxy protected  
polyhydroxystyrene **photoresist** development contrast

- IT Positive **photoresists**  
(chem. amplified; **resists** contg. acid-labile polymers  
protected at hydroxy groups in terminal segments and showing high  
development contrast)
- IT Polymerization  
(living, radical; **resists** contg. acid-labile polymers  
protected at hydroxy groups in terminal segments and showing high  
development contrast)
- IT 138529-81-4 194999-85-4 258342-00-6  
RL: CAT (Catalyst use); TEM (Technical or engineered material use);  
USES (Uses)  
(acid generators; **resists** contg. acid-labile polymers  
protected at hydroxy groups in terminal segments and showing high  
development contrast)
- IT 84540-57-8, Propylene glycol monomethyl ether acetate  
RL: TEM (Technical or engineered material use); USES (Uses)  
(**resist** solvents; **resists** contg. acid-labile  
polymers protected at hydroxy groups in terminal segments and  
showing high development contrast)
- IT 850580-89-1DP, hydrolyzed 850580-90-4DP,  
hydrolyzed 850580-91-5DP, hydrolyzed  
RL: IMF (Industrial manufacture); TEM (Technical or engineered  
material use); PREP (Preparation); USES (Uses)  
(**resists** contg. acid-labile polymers protected at  
hydroxy groups in terminal segments and showing high development  
contrast)
- IT 102-71-6, Triethanolamine, uses  
RL: MOA (Modifier or additive use); TEM (Technical or engineered  
material use); USES (Uses)  
(**resists** contg. acid-labile polymers protected at  
hydroxy groups in terminal segments and showing high development  
contrast)
- IT 31257-96-2D, Hydroxystyrene, polymers, hydroxy-protected  
116550-30-2D, polymers, hydroxy-protected 354589-39-2D, polymers,  
hydroxy-protected  
RL: TEM (Technical or engineered material use); USES (Uses)  
(**resists** contg. acid-labile polymers protected at  
hydroxy groups in terminal segments and showing high development  
contrast)

L30 ANSWER 2 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN  
2002:624453 Document No. 137:147751 A deep-uv positive  
**photoresist** made from co-polymer consisting of methylsilyl  
group contained styrene monomers and acrylic acid monomers, and  
o-nitrobenzyl cholate as dissolution inhibitor. Jiang, Wen-Yan;  
Shan, Huai-De (Taiwan). Taiwan TW 396297 B 20000701, 28 pp.

(Chinese). CODEN: TWXXA5. APPLICATION: TW 1996-85114255 19961120.

GI

\* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT \*

AB A deep-UV (150-400 nm) pos. **photoresist** compn. includes a Si contained co-polymer I(R<sub>1</sub>,<sub>2</sub> = H, CH<sub>3</sub>; m/n = 0.05-1.5) having av. mol. wt. ranging from 5,000-100,000, and o-nitrobenzyl cholate II as dissoln. inhibitor having 10-30 % of the co-polymer in the compn. The invention pos. **photoresist** has good adhesive and anti-etching properties, and has a resoln. about 0.8  $\mu$ m.

IT 190314-19-3P 190314-20-6P

RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(deep-uv pos. **photoresist** compn. contg.)

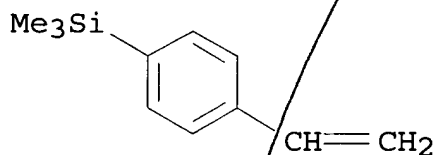
RN 190314-19-3 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, polymer with (4-ethenylphenyl)trimethylsilane (9CI) (CA INDEX NAME)

CM 1

CRN 1009-43-4

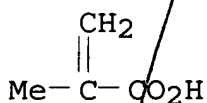
CMF C11 H16 Si



CM 2

CRN 79-41-4

CMF C4 H6 O2



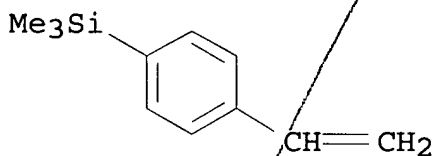
RN 190314-20-6 HCAPLUS

CN 2-Propenoic acid, polymer with (4-ethenylphenyl)trimethylsilane  
(9CI) (CA INDEX NAME)

CM 1

CRN 1009-43-4

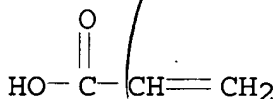
CMF C11 H16 Si



CM 2

CRN 79-10-7

CMF C3 H4 O2



IC ICM G03F007-032

ICS G03F007-039

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and  
Other Reprographic Processes)

Section cross-reference(s): 35, 38

ST pos **photoresist photolithog** UV dissoln inhibitor

IT **Photolithography**

(UV; methylsilyl group contained styrene monomers and acrylic  
acid monomers, and o-nitrobenzyl cholate as dissoln. inhibitor  
for)

IT Positive **photoresists**

(methylsilyl group contained styrene monomers and acrylic acid  
monomers, and o-nitrobenzyl cholate as dissoln. inhibitor for)

IT 102038-15-3P 190314-18-2P **190314-19-3P**  
**190314-20-6P**

RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or  
engineered material use); PREP (Preparation); USES (Uses)  
(deep-uv pos. **photoresist** compn. contg.)

IT 80500-54-5

RL: TEM (Technical or engineered material use); USES (Uses)



(dissoln. inhibitor; deep-uv pos. photoresist compn. contg.)

L30 ANSWER 3 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN  
2002:526352 Document No. 138:56356 Synthesis and characterization of a new alternating copolymer-poly (4-tert-butoxycarbonyl-oxy-3-trimethylsilyl-styrene sulfone). Wang, Guo-fang; Matsuda, Minoru (Chisso Yokohama Research Center, Yokohama, 236-8605, Japan). Shanxi Daxue Xuebao, Ziran Kexueban, 25(2), 124-128 (English) 2002. CODEN: SDXKDT. ISSN: 0253-2395. Publisher: Shanxi Daxue Xuebao Bianjibu.

AB A new monomer 4-tert-butoxycabonyloxy-3-trimethylsilyl-styrene was prepd. in good yield (in 7 steps, 50.1% overall yield). The homopolymer and 1: 1 alternating copolymer of the monomer with sulfur dioxide were followed by free-radical polymn., resp. Their thermal decompn. processes were proposed. Further, their photo-chem. reaction of films contg. onium salt was investigated by IR and UV spectra.

IT 479481-21-5P

RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
(homopolymer; new alternating copolymers of polyolefin sulfones)

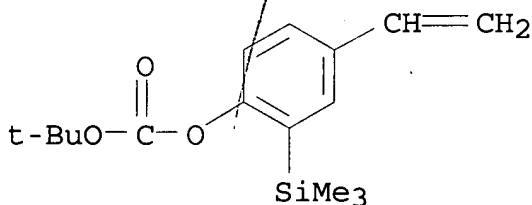
RN 479481-21-5 HCAPLUS

CN Carbonic acid, 1,1-dimethylethyl 4-ethenyl-2-(trimethylsilyl)phenyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 154853-41-5

CMF C16 H24 O3 Si



IT 479481-22-6P

RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
(new alternating copolymers of polyolefin sulfones)

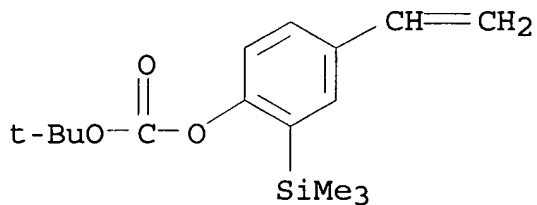
RN 479481-22-6 HCAPLUS

CN Carbonic acid, 1,1-dimethylethyl 4-ethenyl-2-(trimethylsilyl)phenyl ester, polymer with sulfur dioxide, alternating (9CI) (CA INDEX NAME)

CM 1

CRN 154853-41-5

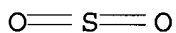
CMF C16 H24 O3 Si



CM 2

CRN 7446-09-5

CMF O2 S



IT 479481-21-5DP, deprotected 479481-22-6DP,  
deprotected

RL: PRP (Properties); SPN (Synthetic preparation); PREP  
(Preparation)

(new alternating copolymers of polyolefin sulfones)

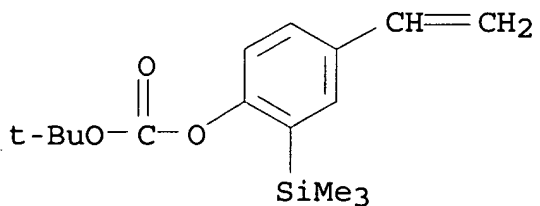
RN 479481-21-5 HCAPLUS

CN Carbonic acid, 1,1-dimethylethyl 4-ethenyl-2-(trimethylsilyl)phenyl  
ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 154853-41-5

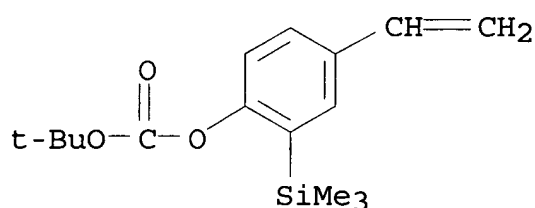
CMF C16 H24 O3 Si



RN 479481-22-6 HCAPLUS  
 CN Carbonic acid, 1,1-dimethylethyl 4-ethenyl-2-(trimethylsilyl)phenyl ester, polymer with sulfur dioxide, alternating (9CI) (CA INDEX NAME)

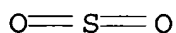
CM 1

CRN 154853-41-5  
 CMF C16 H24 O3 Si



CM 2

CRN 7446-09-5  
 CMF O2 S



CC 35-8 (Chemistry of Synthetic High Polymers)  
 ST alternating copolymer prepn trimethylsilyl styrene sulfone polymer decompn **photoresist**  
 IT **Photoresists**  
     (new alternating copolymers of polyolefin sulfones)  
 IT **479481-21-5P**  
     RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
     (homopolymer; new alternating copolymers of polyolefin sulfones)  
 IT **479481-22-6P** 479481-27-1P  
     RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
     (new alternating copolymers of polyolefin sulfones)  
 IT **479481-21-5DP**, deprotected **479481-22-6DP**, deprotected 479481-27-1DP, deprotected  
     RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
     (new alternating copolymers of polyolefin sulfones)

L30 ANSWER 4 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN  
1999:513148 Document No. 131:293200 Interfacial cationic graft  
polymerization **lithography**. Brodsky, Colin J.; Willson,  
C. Grant (Department of Chemical Engineering, The University of  
Texas at Austin, Austin, TX, 78712, USA). Polymeric Materials  
Science and Engineering, 81, 83-84 (English) 1999. CODEN: PMSEDG.  
ISSN: 0743-0515. Publisher: American Chemical Society.

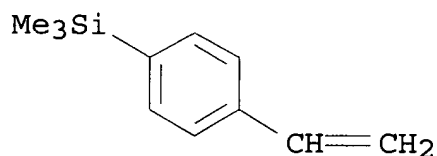
AB A QCM (quartz crystal microbalance)-monitored deposition system has  
been designed and built that enables study of the graft polymn.  
reaction kinetics. A sensitive and stable tool has been developed  
to study the reaction kinetics of the cationic graft polymn. of  
silane monomers. Several custom silane monomers have been designed,  
synthesized, and evaluated for potential in a **lithog.**  
process. Depositions with these materials show that the cationic  
graft polymn. system exhibits nonlinearity in several process steps.  
Ultimately, nonlinearity of this sort can be exploited to provide  
high contrast imaging.

IT **79716-05-5P**  
RL: PEP (Physical, engineering or chemical process); SPN (Synthetic  
preparation); PREP (Preparation); PROC (Process)  
(QCM-monitored deposition system for studying reaction kinetics  
of cationic graft polymn. of silane monomers)

RN 79716-05-5 HCAPLUS  
CN Silane, (4-ethenylphenyl)trimethyl-, homopolymer (9CI) (CA INDEX  
NAME)

CM 1

CRN 1009-43-4  
CMF C11 H16 Si



CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and  
Other Reprographic Processes)  
Section cross-reference(s): 35, 36, 76

ST interfacial cationic graft polymn **lithog**  
**photolithog** quartz crystal microbalance

IT Photoimaging materials  
**Photolithography**  
**Photoresists**  
Polymerization kinetics

Semiconductor device fabrication

Silylation

Vapor deposition process

(QCM-monitored deposition system for studying reaction kinetics of cationic graft polymn. of silane monomers).

IT 9003-09-2P, Methyl vinyl ether homopolymer 42500-82-3P

79716-05-5P 123738-95-4P

RL: PEP (Physical, engineering or chemical process); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)

(QCM-monitored deposition system for studying reaction kinetics of cationic graft polymn. of silane monomers)

L30 ANSWER 5 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN

1997:285788 Document No. 127:25738 **Lithographic**

characterization of poly(4-vinylphenyldimethylvinylsilane) having narrow molecular weight distribution. Se, Kazunori; Matsumura, Kohzaburoh; Kazama, Takeo; Fujimoto, Teruo (Department of Materials Science and Engineering, Faculty of Engineering, Fukui University, Fukui, 910, Japan). Polymer Journal (Tokyo), 29(4), 387-390 (English) 1997. CODEN: POLJB8. ISSN: 0032-3896. Publisher: Society of Polymer Science, Japan.

AB Poly(4-vinylphenyldimethylvinylsilane) contg. a silylvinyl group as a side chain was found to act as neg. **resist** when exposed to deep-UV light and electron-beam.

IT 98539-45-8, 4-Vinylphenyldimethylvinylsilane homopolymer

RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)

(**lithog.** characterization of poly(4-vinylphenyldimethylvinylsilane) having narrow mol. wt. distribution)

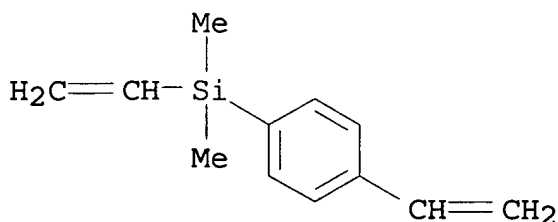
RN 98539-45-8 HCAPLUS

CN Silane, ethenyl(4-ethenylphenyl)dimethyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 18053-60-6

CMF C12 H16 Si



- CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
- ST vinylphenyldimethylvinylsilane polymer **lithog resist**; electron beam **lithog resist**  
vinylphenyldimethylvinylsilane polymer; **photoresists**  
vinylphenyldimethylvinylsilane polymer
- IT Electron beam **resists**  
**Photoresists**  
(**lithog.** characterization of poly(4-vinylphenyldimethylvinylsilane) having narrow mol. wt. distribution)
- IT **98539-45-8**, 4-Vinylphenyldimethylvinylsilane homopolymer  
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)  
(**lithog.** characterization of poly(4-vinylphenyldimethylvinylsilane) having narrow mol. wt. distribution)
- IT 52434-87-4, Cumyl cesium  
RL: CAT (Catalyst use); USES (Uses)  
(polymn. of 4-vinylphenyldimethylvinylsilane to prep. **lithog. resist** with narrow mol. wt. distribution)
- IT 18053-60-6, 4-Vinylphenyldimethylvinylsilane  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(polymn. of 4-vinylphenyldimethylvinylsilane to prep. **lithog. resist** with narrow mol. wt. distribution)
- L30 ANSWER 6 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN  
1997:275514 Document No. 127:11005 New deep-ultraviolet positive **photoresists**. II. copolymers of p-trimethylsilylstyrenes and acrylics. Chiang, Wen-Yen; Shann, Hwai-Der (Department of Chemical Engineering, Tatung Institute of Technology, Taipei, 10451, Taiwan). Journal of Vacuum Science & Technology, B: Microelectronics and Nanometer Structures, 15(2), 299-305 (English) 1997. CODEN: JVTBD9. ISSN: 0734-211X. Publisher: American Institute of Physics.
- AB O-Nitrobenzyl cholate, which has been widely used as the photoactive component in dissoln. inhibition of deep-UV **photoresists** of poly(methylmethacrylate-co-methacrylic acid), incorporated into bilayer **resist** systems using acrylic copolymers contg. Si. Poly(p-trimethylsilyl- $\alpha$ -methylstyrene-co-methacrylic acid), poly(p-trimethylsilyl- $\alpha$ -methylstyrene-co-methacrylic acid), and poly(p-trimethylsilylstyrene-co-acrylic acid), were synthesized, and their thermal properties were investigated by thermogravimetry and differential scanning calorimetry. The chain-stiffening effects of the  $\alpha$ -methylstyrene and styrene groups were responsible for high thermal stabilities. The developed patterns exhibited good

adhesion to the silicon substrates without the use of any adhesion promoter. The resolu. of the **resists** was at least 0.8  $\mu\text{m}$  and exhibited an oxygen plasma etching rate of 1:15, compared with hard-baked HPR-204. The polymers can have application as imaging top layers for bilayer **resist** systems.

IT 190314-19-3 190314-20-6

RL: DEV (Device component use); PRP (Properties); USES (Uses)  
(**photoresist** bilayer; p-trimethylsilylstyrene-contg.  
acrylic copolymers contg. o-nitrobenzyl cholate for manuf. of  
deep-UV pos. **photoresists**)

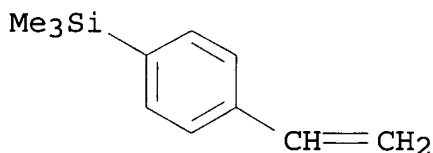
RN 190314-19-3 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, polymer with (4-ethenylphenyl)trimethylsilane (9CI) (CA INDEX NAME)

CM 1

CRN 1009-43-4

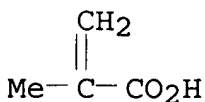
CMF C11 H16 Si



CM 2

CRN 79-41-4

CMF C4 H6 O2



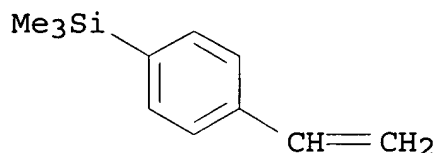
RN 190314-20-6 HCAPLUS

CN 2-Propenoic acid, polymer with (4-ethenylphenyl)trimethylsilane  
(9CI) (CA INDEX NAME)

CM 1

CRN 1009-43-4

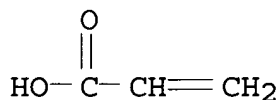
CMF C11 H16 Si



CM 2

CRN 79-10-7

CMF C3 H4 O2



- CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)  
Section cross-reference(s): 38
- ST acrylic silylstyrene copolymer pos **photoresist**;  
nitrobenzyl cholate acrylic silylstyrene **photoresist**;  
thermal stability acrylic silylstyrene **photoresist**; UV pos **photoresist** acrylic silylstyrene
- IT Positive **photoresists**  
(bilayer; p-trimethylsilylstyrene-contg. acrylic copolymers contg. o-nitrobenzyl cholate for manuf. of deep-UV pos. **photoresists**)
- IT Etching  
(plasma, oxygen; p-trimethylsilylstyrene-contg. acrylic copolymers contg. o-nitrobenzyl cholate for manuf. of deep-UV pos. **photoresists**)
- IT 190314-21-7  
RL: DEV (Device component use); NUU (Other use, unclassified); USES (Uses)  
(photoactive component; p-trimethylsilylstyrene-contg. acrylic copolymers contg. o-nitrobenzyl cholate for manuf. of deep-UV pos. **photoresists**)
- IT 102038-15-3 190314-18-2 190314-19-3 190314-20-6  
RL: DEV (Device component use); PRP (Properties); USES (Uses)  
(**photoresist** bilayer; p-trimethylsilylstyrene-contg. acrylic copolymers contg. o-nitrobenzyl cholate for manuf. of deep-UV pos. **photoresists**)
- IT 7782-44-7, Oxygen, uses  
RL: NUU (Other use, unclassified); USES (Uses)



(plasma, etching with; p-trimethylsilylstyrene-contg. acrylic copolymers contg. o-nitrobenzyl cholate for manuf. of deep-UV pos. **photoresists**)

L30 ANSWER 7 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN

1996:387860 Document No. 125:46874 Dry development in **lithography** and manufacture of semiconductor devices.

Yamaguchi, Atsuko; Ogawa, Taro; Soga, Takashi; Ito, Masaaki; Matsuzaka, Takashi; Tachibana, Hiroaki; Matsumoto, Mutsuyoshi (Hitachi Ltd, Japan; Kogyo Gijutsuin). Jpn. Kokai Tokkyo Koho JP 08069959 A2 19960312 Heisei, 9 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1994-204966 19940830.

AB The process involves (1) forming a bottom **resist** film on a substrate, (2) forming a top **resist** film contg. an acrylic monomer-silylolefin copolymer or a sulfone-silane copolymer, (3) x-ray irradiation onto the top **resist** film for self-development, (4) dry etching of the residues of the exposed top **resist** film with halo- or halide-contg. gas (e.g., Cl<sub>2</sub>, Br<sub>2</sub>, HBr, SF<sub>6</sub>, SF<sub>4</sub>, CHF<sub>3</sub>, CF<sub>4</sub>), for patterning the top **resist** film. The top **resist** film may be formed by CVD, plasma polymn., or deposition polymn. The bottom **resist** film may be patterned by O<sub>2</sub>-gas reactive ion etching with the patterned top **resist** film as a **mask**. In the process the bottom **resist** film is replaced with a C coating on a substrate. The process gives Si-contg. **resist masks** with a high-resoln. pattern in the device manuf.

IT 113032-02-3

RL: PEP (Physical, engineering or chemical process); PROC (Process) (**resist**; dry development of silicone **resists** in semiconductor device manuf.)

RN 113032-02-3 HCAPLUS

CN Silane, (4-ethenylphenyl)trimethyl-, polymer with sulfur dioxide (9CI) (CA INDEX NAME)

CM 1

CRN 7446-09-5

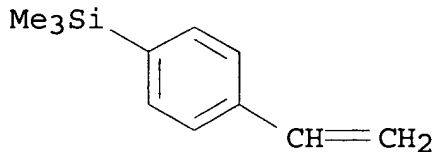
CMF 02 S

O=S=O

CM 2

CRN 1009-43-4

CMF C11 H16 Si



IC ICM H01L021-027  
ICS G03F007-26

CC 76-3 (Electric Phenomena)  
Section cross-reference(s): 38, 74

ST **resist** dry development etching semiconductor;  
**photoresist** dry development etching semiconductor;  
**lithog** silicone **resist** dry development; silicone  
**resist** dry development semiconductor

IT Semiconductor devices  
(dry development of silicone **resists** in semiconductor  
device manuf.)

IT Sputtering  
(etching, dry development of silicone **resists** in  
semiconductor device manuf.)

IT **Resists**  
(photo-, dry development of silicone **resists** in  
semiconductor device manuf.)

IT Acrylic polymers, processes  
RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(silicon-contg., **resist**; dry development of silicone  
**resists** in semiconductor device manuf.)

IT Etching  
(sputter, dry development of silicone **resists** in  
semiconductor device manuf.)

IT 75-46-7, Carbon trifluoride 75-73-0 2551-62-4, Hexafluorosulfur  
7726-95-6, Bromine, uses 7782-50-5, Chlorine, uses 7783-60-0,  
Sulfur tetrafluoride 10035-10-6, Hydrogen bromide, uses  
RL: NUU (Other use, unclassified); USES (Uses)  
(etchant; dry development of silicone **resists** in  
semiconductor device manuf.)

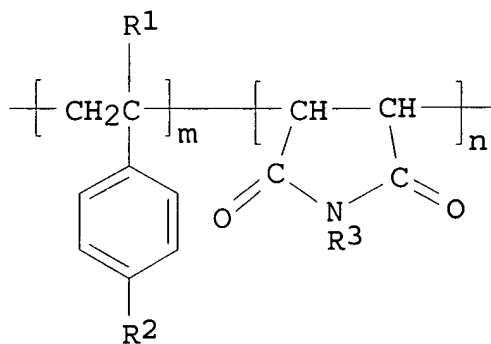
IT 113032-02-3 123467-78-7  
RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(**resist**; dry development of silicone **resists**  
in semiconductor device manuf.)

IT 7440-44-0, Carbon, processes  
RL: NUU (Other use, unclassified); PEP (Physical, engineering or  
chemical process); PROC (Process); USES (Uses)  
(undercoating of **resist**, **mask**; dry  
development of silicone **resists** in semiconductor device

manuf.)

L30 ANSWER 8 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN  
 1995:986743 Document No. 124:160400 Resist composition and  
 pattern-forming method. Kodachi, Akiko; Takechi, Satoshi (Fujitsu  
 Ltd, Japan). Jpn. Kokai Tokkyo Koho JP 07253673 A2 19951003 Heisei,  
 8 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1994-44014  
 19940315.

GI



AB The compn. comprises a photosensitive acid generator and a resin I  
 [R1 = H, halo, alkyl, halogenated alkyl; one of R2-3 =  
 (CH2)iSiR4R5R6; (R4-6 = C1-4 alkyl, Ph, (CH2)jSiR7R8R9; R7-9 = C1-4  
 alkyl, Ph; i, j = 1-4); another of R2-3 = group having  
 acid-releasable group; when R2 is Si-contg. group, 2/3 ≤ m/n  
 ≤ 4; when R3 is Si-contg. group, 2/3 < n/m ≤ 4;  
 wt.-av. mol. wt. = 100-1,000,000]. The acid generator may be a  
 sulfonium salt, sulfonic acid ester, iodonium salt, or halo compd.  
 The compn. is coated on a substrate, exposed by excimer laser,  
 baked, and developed to form patterns. The compn. gives chem.  
 amplified resist with good plasma resistance.

IT 158947-13-8P 173307-32-9P

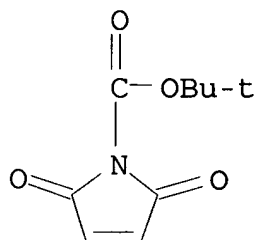
RL: PNU (Preparation, unclassified); TEM (Technical or engineered  
 material use); PREP (Preparation); USES (Uses)  
 (chem. amplified resist compn. contg. maleimide-styrene  
 copolymer with silyl group and acid generator)

RN 158947-13-8 HCAPLUS

CN 1H-Pyrrole-1-carboxylic acid, 2,5-dihydro-2,5-dioxo-,  
 1,1-dimethylethyl ester, polymer with (4-  
 ethenylphenyl)trimethylsilane (9CI) (CA INDEX NAME)

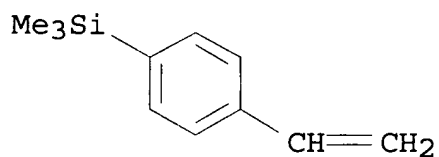
CM 1

CRN 114650-82-7  
CMF C9 H11 N O4



CM 2

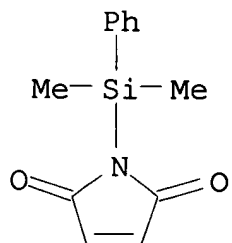
CRN 1009-43-4  
CMF C11 H16 Si



RN 173307-32-9 HCAPLUS  
CN 1H-Pyrrole-2,5-dione, 1-(dimethylphenylsilyl)-, polymer with  
(4-ethenylphenyl)trimethylsilane (9CI) (CA INDEX NAME)

CM 1

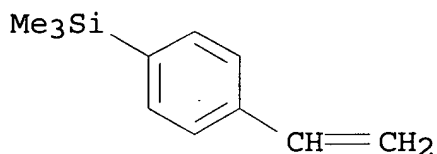
CRN 173307-31-8  
CMF C12 H13 N O2 Si



CM 2

CRN 1009-43-4

CMF C11 H16 Si



- IC ICM G03F007-075  
ICS C08K005-42; C08L025-18; C08L035-02; C08L043-04; G03F007-004; G03F007-038; H01L021-027
- CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
- ST **resist** maleimide styrene copolymer; silyl group copolymer  
chem **resist**; acid generator chem amplified **resist**
- IT **Resists**  
(chem. amplified; chem. amplified **resist** compn. contg. maleimide-styrene copolymer with silyl group and acid generator)
- IT 57840-38-7, Triphenylsulfonium hexafluoroantimonate  
RL: MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)  
(chem. amplified **resist** compn. contg. maleimide-styrene copolymer with silyl group and acid generator)
- IT **158947-13-8P 173307-30-7P 173307-32-9P**  
RL: PNU (Preparation, unclassified); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(chem. amplified **resist** compn. contg. maleimide-styrene copolymer with silyl group and acid generator)
- L30 ANSWER 9 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN  
1995:677202 Document No. 123:70354 Method for forming **resist** pattern.. Shirai, Masamitsu; Tunooka, Masahiro; Nishijima, Kanji (Nippon paint Co. Ltd., Japan). Eur. Pat. Appl. EP 626620 A1 19941130, 11 pp. DESIGNATED STATES: R: DE, FR, GB. (English). CODEN: EPXXDW. APPLICATION: EP 1994-108008 19940524. PRIORITY: JP 1993-159902 19930524.
- AB A method for forming a **resist** pattern comprises irradiating an active light ray to a **resist** obtained by coating a photosensitive resin compn. contg. a compd. capable of generating an acid due to irradiation of the active light ray and a silyloxy compd. in a binder resin on a substrate through a pattern **mask** to decompose the silyloxy compd. due to the acid generated at the irradiation region to form a silanol compd., and after

removing the silanol compd., removing the exposed parts of the **resist** by O plasma, the removal of the silanol compd. being conducted by brining the film after irradiation of the active light ray into contact with volatile org. solvent vapor having a boiling of  $\leq 150^\circ$ . This method can produce patterns in the submicron region.

IT **164914-62-9**

RL: MOA (Modifier or additive use); USES (Uses)  
(**photoresist** compn.)

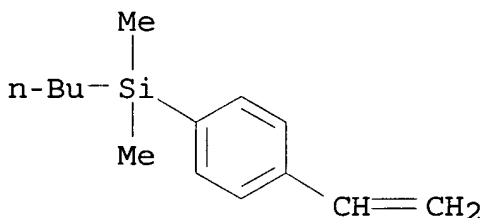
RN 164914-62-9 HCAPLUS

CN Silane, butyl(4-ethenylphenyl)dimethyl-, polymer with ethenylbenzene  
(9CI) (CA INDEX NAME)

CM 1

CRN 104719-21-3

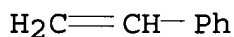
CMF C14 H22 Si



CM 2

CRN 100-42-5

CMF C8 H8



IC ICM G03F007-075

ICS G03F007-38

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

ST **photoresist** elec circuit silanol polymer

IT **Resists**

(photo-, compn. contg. silanol polymer)

IT 38296-22-9, Styrene-trimethylsilyl methacrylate copolymer

74508-43-3 164914-61-8 **164914-62-9** 164914-63-0

RL: MOA (Modifier or additive use); USES (Uses)

(photoresist compn.)

L30 ANSWER 10 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN  
1995:664303 Document No. 123:56705 Synthesis and polymerization of  
t-BOC protected maleimide monomers: N-(t-butylloxycarbonyloxy)maleimide and N-[p-(t-butylloxycarbonyloxy)phenyl]maleimide. Ahn, Kwang-Duk; Koo, Deok-Il; Willson, C. Grant (Functional Polymer Lab., Korea Inst. Sci. Technol., Seoul, 130-650, S. Korea). Polymer, 36(13), 2621-8 (English) 1995. CODEN: POLMAG. ISSN: 0032-3861. Publisher: Elsevier.

AB The title protected maleimide monomers were prepd. and polymd. Their copolymers with styrene derivs. were obtained in high conversion. The copolymers were cleanly deprotected by heating. The deprotected copolymers have very high glass transition temps. (>250°) and good soly. in aq. base solns., whereas the protected polymers are only sol. in org. solvents. The copolymers were evaluated as **photoresists**.

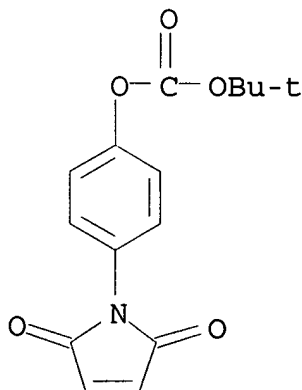
IT **165127-66-2DP**, thermally deprotected  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
(prepn. and properties of)

RN 165127-66-2 HCAPLUS

CN Carbonic acid, 4-(2,5-dihydro-2,5-dioxo-1H-pyrrol-1-yl)phenyl 1,1-dimethylethyl ester, polymer with (4-ethenylphenyl)trimethylsilane (9CI) (CA INDEX NAME)

CM 1

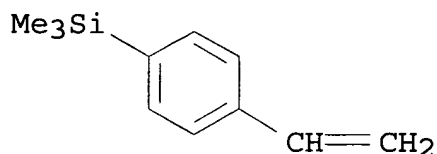
CRN 104469-25-2  
CMF C15 H15 N O5



CM 2

CRN 1009-43-4

CMF C11 H16 Si



IT 165127-66-2P, N-[p-[(tert-Butoxycarbonyl)oxy]phenyl]maleimid  
e-p-(trimethylsilyl)styrene copolymer  
RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation);  
PREP (Preparation); RACT (Reactant or reagent)  
(prepn., properties and deprotection of)

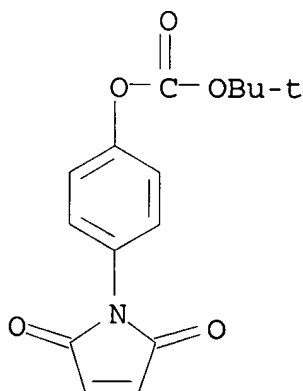
RN 165127-66-2 HCAPLUS

CN Carbonic acid, 4-(2,5-dihydro-2,5-dioxo-1H-pyrrol-1-yl)phenyl  
1,1-dimethylethyl ester, polymer with (4-  
ethenylphenyl)trimethylsilane (9CI) (CA INDEX NAME)

CM 1

CRN 104469-25-2

CMF C15 H15 N O5

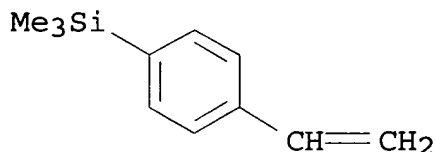


CM 2

CRN 1009-43-4

CMF C11 H16 Si





- CC 35-4 (Chemistry of Synthetic High Polymers)  
Section cross-reference(s): 74
- ST butoxycarbonyl protected hydroxymaleimide prepn polymn;  
**photoresist** protected hydroxymaleimide copolymer
- IT **Resists**  
(photo-, evaluation of protected hydroxy-contg. maleimide copolymer formulations for)
- IT 25657-77-6P, N-(p-Hydroxyphenyl)maleimide-styrene copolymer  
26983-56-2P, N-Hydroxymaleimide-styrene copolymer 104469-26-3DP,  
thermally deprotected 117725-93-6DP, thermally deprotected  
118649-20-0DP, thermally deprotected 165127-59-3DP, thermally  
deprotected 165127-60-6DP, thermally deprotected 165127-61-7DP,  
thermally deprotected 165127-62-8DP, thermally deprotected  
165127-63-9DP, thermally deprotected 165127-64-0DP, thermally  
deprotected 165127-65-1DP, thermally deprotected  
**165127-66-2DP**, thermally deprotected 165127-68-4P,  
N-(p-Hydroxyphenyl)maleimide-p-methylstyrene copolymer  
RL: PRP (Properties); SPN (Synthetic preparation); PREP  
(Preparation)  
(prepn. and properties of)
- IT 104469-26-3P, N-[p-[(tert-Butoxycarbonyl)oxy]phenyl]maleimide-  
styrene copolymer 117725-93-6P, N-[(tert-  
Butoxycarbonyl)oxy]maleimide-styrene copolymer 118649-20-0P,  
N-[p-[(tert-Butoxycarbonyl)oxy]phenyl]maleimide homopolymer  
165127-59-3P, N-[(tert-Butoxycarbonyl)oxy]maleimide-p-methylstyrene  
copolymer 165127-60-6P, N-[(tert-Butoxycarbonyl)oxy]maleimide-p-  
chlorostyrene copolymer 165127-61-7P, N-[(tert-  
Butoxycarbonyl)oxy]maleimide-p-[(tert-butoxycarbonyl)oxy]styrene  
copolymer 165127-62-8P, N-[p-[(tert-Butoxycarbonyl)oxy]phenyl]male  
imide-p-methylstyrene copolymer 165127-63-9P, N-[p-[(tert-  
Butoxycarbonyl)oxy]phenyl]maleimide-p-chlorostyrene copolymer  
165127-64-0P, p-Acetoxystyrene-N-[p-[(tert-  
butoxycarbonyl)oxy]phenyl]maleimide copolymer 165127-65-1P,  
N-[p-[(tert-Butoxycarbonyl)oxy]phenyl]maleimide-p-[(tert-  
butoxycarbonyl)oxy]styrene copolymer **165127-66-2P**,  
N-[p-[(tert-Butoxycarbonyl)oxy]phenyl]maleimide-p-  
(trimethylsilyl)styrene copolymer  
RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation);  
PREP (Preparation); RACT (Reactant or reagent)

(prepn., properties and deprotection of)

L30 ANSWER 11 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN  
1994:701627 Document No. 121:301627 Alternating maleimide-silylstyrene copolymers for **photoresists**. Chiang, Wen Yen; Liu, Jin Yuh (National Science Council, Taiwan). U.S. US 5317069 A 19940531, 6 pp. (English). CODEN: USXXAM. APPLICATION: US 1993-73133 19930607.

AB The title copolymers have wt.-av. mol. wt. of 25,000-120,000, and is useful in the prepn. of a **photoresist** compn. Maleimide and p-trimethylsilyl- $\alpha$ -methylstyrene were copolymd. to give an alternating copolymer.

IT **150883-77-5P**

RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(alternating maleimide-silylstyrene copolymers for **photoresists**)

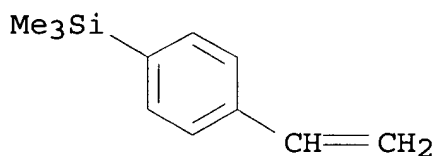
RN 150883-77-5 HCAPLUS

CN 1H-Pyrrole-2,5-dione, polymer with (4-ethenylphenyl)trimethylsilane, alternating (9CI) (CA INDEX NAME)

CM 1

CRN 1009-43-4

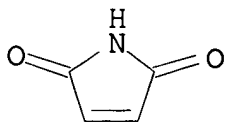
CMF C11 H16 Si



CM 2

CRN 541-59-3

CMF C4 H3 N O2



IC ICM C08F022-40

INCL 526262000

CC 35-4 (Chemistry of Synthetic High Polymers)

Section cross-reference(s): 74

ST alternating maleimide silylstyrene copolymer **photoresist**

IT **Resists**

(photo-, alternating maleimide-silylstyrene copolymers for **photoresists**)

IT 75-77-4, Chlorotrimethylsilane, reactions 1712-70-5,  
p-Chloro- $\alpha$ -methylstyrene

RL: RCT (Reactant); RACT (Reactant or reagent)

(alternating maleimide-silylstyrene copolymers for **photoresists**)

IT 1009-43-4P, p-Trimethylsilylstyrene 17920-24-0P,  
p-Trimethylsilyl- $\alpha$ -methylstyrene

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation);  
RACT (Reactant or reagent)

(alternating maleimide-silylstyrene copolymers for **photoresists**)

IT 150883-76-4P **150883-77-5P**

RL: SPN (Synthetic preparation); TEM (Technical or engineered  
material use); PREP (Preparation); USES (Uses)

(alternating maleimide-silylstyrene copolymers for **photoresists**)

L30 ANSWER 12 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN

1994:689674 Document No. 121:289674 N-tertiarybutoxycarbonylmaleimide  
homo- and copolymers and imaging with positive-working  
**resists** using same. (Korea Institute of Science and  
Technology, S. Korea). Jpn. Kokai Tokkyo Koho JP 06080724 A2  
19940322 Heisei, 8 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP  
1992-24158 19920210. PRIORITY: KR 1991-10272 19910621.

AB The title homopolymer is obtained by thermally polyimg. the monomer  
in the presence of Bz2O2. The title copolymer is obtained by  
radical polyimg. the above monomer with a styrene deriv. The styrene  
derivs. are selected from styrene, p-acetoxystyrene,  
p-methylstyrene, p-chlorostyrene, m-chlorostyrene,  
p-tertiarybutoxycarbonyloxystyrene, p-trimethylsilylmethylstyrene,  
and p-trimethylsilylstyrene. Imaging is effected by coating a Si  
wafer with the title polymer contg. an onium salt, prebaking,  
exposing to far-UV, heat-treating, and developing. High-resoln.  
high-sensitivity imaging can be effected.

IT **158947-13-8P**

RL: DEV (Device component use); SPN (Synthetic preparation); PREP  
(Preparation); USES (Uses)

(N-tertiarybutoxycarbonylmaleimide homo- and copolymers and  
imaging with pos.-working **resists** using same)

RN 158947-13-8 HCAPLUS

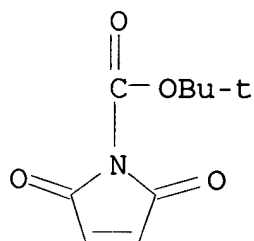
CN 1H-Pyrrole-1-carboxylic acid, 2,5-dihydro-2,5-dioxo-,

1,1-dimethylethyl ester, polymer with (4-ethenylphenyl)trimethylsilane (9CI) (CA INDEX NAME)

CM 1

CRN 114650-82-7

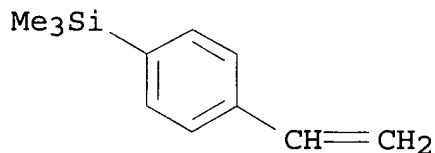
CMF C9 H11 N O4



CM 2

CRN 1009-43-4

CMF C11 H16 Si



IC ICM C08F022-40  
ICS C08F212-04; G03F007-004; G03F007-027; G03F007-039; G03F007-30;  
G03F007-38; H01L021-027

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and  
Other Reprographic Processes)  
Section cross-reference(s): 76

ST maleimide polymer **photoresist** imaging

IT Semiconductor devices  
(N-tertiarybutoxycarbonylmaleimide homo- and copolymers and  
imaging with pos.-working **resists** using same)

IT **Resists**  
(photo-, N-tertiarybutoxycarbonylmaleimide homo- and copolymers  
and imaging with pos.-working **resists** using same)

IT 114650-83-8P 158947-09-2P 158947-10-5P 158947-11-6P  
158947-12-7P **158947-13-8P** 158947-14-9P 158947-15-0P  
158947-16-1P 158947-17-2P

RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)

(N-tertiarybutoxycarbonylmaleimide homo- and copolymers and imaging with pos.-working **resists** using same)

IT 120543-51-3P

RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(N-tertiarybutoxycarbonylmaleimide homo- and copolymers and imaging with pos.-working **resists** using same)

L30 ANSWER 13 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN

1994:496047 Document No. 121:96047 Copolymer of sulfur dioxide and substituted styrene derivative and its **resist** material.

Matsuda, Minoru; Ono, Hiroshi; Ito, Seiju; Aono, Toshiharu (Chisso Corp, Japan). Jpn. Kokai Tokkyo Koho JP 05331289 A2 19931214 Heisei, 10 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1991-313629 19911031.

GI

\* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT \*

AB The copolymer with no. av. mol. wt. 2000-2,000,000 consists of linear II [R1-2 = H, C1-4 alkyl, (SiMe2)yMe; R3 = (CH2)m; y = 1-3; m = 0-3; X = OH, tert-butoxy, tert-butoxycarbonyloxy; R1 = R2 ≠ H if m = 0; p = 1-99; n = 10-10,000] having 1-50 mol% SO2 units and 50-99 mol% styrene units I or IV (p, q = 1-10; l = 15-99; m = 1-85; p + q = 50-99; n = 5-5000) having 1-50 mol% SO2 units, 15-98 mol% II units, and 1-84 mol% styrene units III. The **resist** material contains the copolymer. The material showed high sensitivity, resoln., and dry-etching resistance.

IT 154853-42-6P

RL: PREP (Preparation)

(prepn. of, **resist**, with high sensitivity and resoln. and dry-etching resistance)

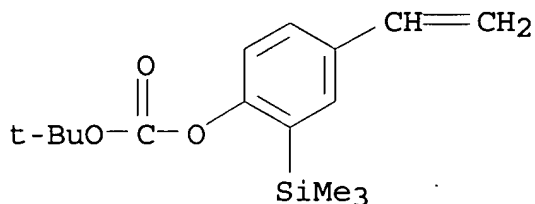
RN 154853-42-6 HCAPLUS

CN Carbonic acid, 1,1-dimethylethyl 4-ethenylphenyl ester, polymer with 1,1-dimethylethyl 4-ethenyl-2-(trimethylsilyl)phenyl carbonate (9CI) (CA INDEX NAME)

CM 1

CRN 154853-41-5

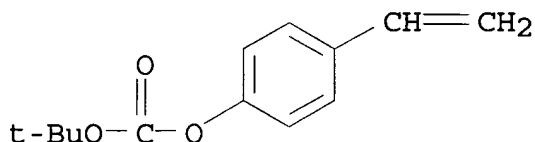
CMF C16 H24 O3 Si



CM 2

CRN 87188-51-0

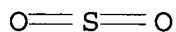
CMF C13 H16 O3



CM 3

CRN 7446-09-5

CMF O2 S



IC ICM C08G075-22

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)  
 Section cross-reference(s): 35

ST **photoresist** sulfur oxide styrene copolymer; polysulfone  
 styrene modified **photoresist**

IT Polysulfones, uses

RL: USES (Uses)

(styrene-contg., **photoresist**, with high sensitivity and  
 resoln. and dry-etching resistance)

IT **Resists**

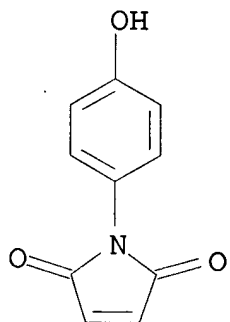
(photo-, sulfur dioxide-substituted styrene copolymer, with high  
 sensitivity and resoln. and dry-etching resistance)

IT 154853-38-0P 154853-40-4P **154853-42-6P**

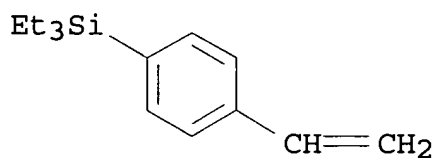
RL: PREP (Preparation)

(prepn. of, **resist**, with high sensitivity and resoln.  
 and dry-etching resistance)

L30 ANSWER 14 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN  
1994:120782 Document No. 120:120782 Preparation of silicon-containing  
**photoresists** for use in integrated circuit microlithography.  
Chiang, Wen Yen; Lu, Jin Yuh (Tatung Co., Taiwan). U.S. US 5262500  
A 19931116, 6 pp. (English). CODEN: USXXAM. APPLICATION: US  
1991-781616 19911023.  
AB Si contg. copolymers are mixed with diazonaphthoquinone esters to  
give UV **photoresists** for use in microlithog. on integrated  
circuits. The copolymer structure has a thermally resistant group,  
N-(4-hydroxyphenyl)maleimide, and an O plasma resistant group,  
para-trialkylsilylstyrene.  
IT **152827-56-0 152827-57-1**  
RL: USES (Uses)  
(in heat and oxygen plasma-resistant **photoresists**)  
RN 152827-56-0 HCAPLUS  
CN 1H-Pyrrole-2,5-dione, 1-(4-hydroxyphenyl)-, polymer with  
(4-ethenylphenyl)triethylsilane, alternating (9CI) (CA INDEX NAME)  
  
CM 1  
  
CRN 7300-91-6  
CMF C10 H7 N O3



CM 2  
  
CRN 1015-16-3  
CMF C14 H22 Si



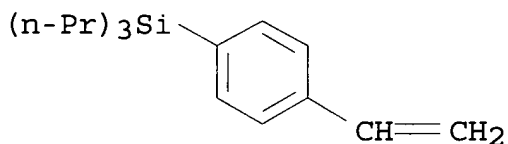
RN 152827-57-1 HCAPLUS

CN 1H-Pyrrole-2,5-dione, 1-(4-hydroxyphenyl)-, polymer with  
(4-ethenylphenyl)tripropylsilane, alternating (9CI) (CA INDEX NAME)

CM 1

CRN 103298-69-7

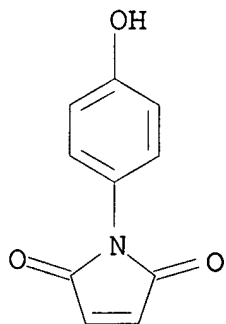
CMF C17 H28 Si



CM 2

CRN 7300-91-6

CMF C10 H7 N O3



IT 147554-71-0DP, hydrolyzed 150883-81-1P

RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. and use of, in heat and oxygen plasma-resistant  
photoresists)

RN 147554-71-0 HCAPLUS

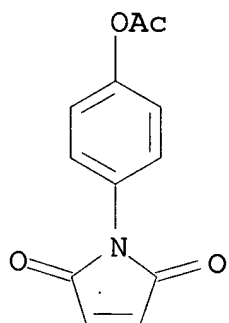


CN 1H-Pyrrole-2,5-dione, 1-[4-(acetyloxy)phenyl]-, polymer with  
(4-ethenylphenyl)trimethylsilane, alternating (9CI) (CA INDEX NAME)

CM 1

CRN 6637-46-3

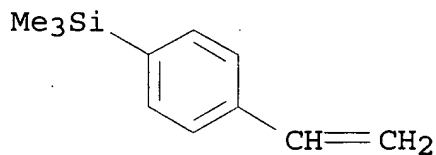
CMF C12 H9 N O4



CM 2

CRN 1009-43-4

CMF C11 H16 Si



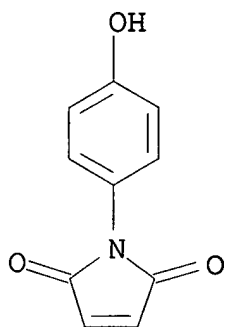
RN 150883-81-1 HCAPLUS

CN 1H-Pyrrole-2,5-dione, 1-(4-hydroxyphenyl)-, polymer with  
(4-ethenylphenyl)trimethylsilane, alternating (9CI) (CA INDEX NAME)

CM 1

CRN 7300-91-6

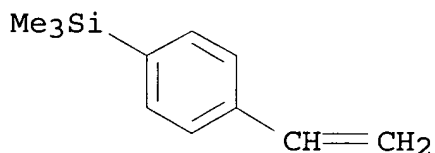
CMF C10 H7 N O3



CM 2

CRN 1009-43-4

CMF C11 H16 Si



IC ICM C08F222-40

ICS C08F230-08

INCL 526262000

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)  
 Section cross-reference(s): 76

ST silicon **photoresist** integrated circuit microlithog

IT Electric circuits

(integrated, **photoresists** contg. thermally resistant and plasma etching resistant copolymer for)

IT **Resists**

(photo-, contg. thermally resistant and plasma etching resistant copolymer)

IT **152827-56-0 152827-57-1**

RL: USES (Uses)

(in heat and oxygen plasma-resistant **photoresists**)

IT **147554-71-0DP, hydrolyzed 150883-81-1P**

RL: SPN (Synthetic preparation); PREP (Preparation)

(prepn. and use of, in heat and oxygen plasma-resistant **photoresists**)

L30 ANSWER 15 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN

1994:90541 Document No. 120:90541 Preparation of novel silylstyrene-maleimide copolymers for near-UV **resist** and its integrated circuit (IC) **lithographic** properties.

Chiang, W. Y.; Lu, J. Y. (Dep. Chem. Eng., Tatung Inst. Technol., Taipei, 10451, Taiwan). Annual Technical Conference - Society of Plastics Engineers, 50th(Vol. 1), 1011-15 (English) 1992. CODEN: ACPED4. ISSN: 0272-5223.

AB Several new copolymers contg. the silyl group are prepd. for **photoresist** use. They show characteristics of neg.-type **resists** in the presence of benzophenone-type sensitizer. Photoreaction mechanism involves crosslinking by benzophenone radicals. The images obtained were resistant to thermal deformation at 330°, had good adhesion to the silicon wafer, and resistance to oxygen plasma etching.

IT 133624-55-2P 152590-58-4P 152590-59-5P

RL: PREP (Preparation)

(prepn. and **lithog.** properties of **photoresist** contg., for integrated circuit fabrications)

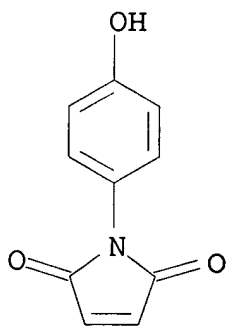
RN 133624-55-2 HCAPLUS

CN 1H-Pyrrole-2,5-dione, 1-(4-hydroxyphenyl)-, polymer with (4-ethenylphenyl)trimethylsilane (9CI) (CA INDEX NAME)

CM 1

CRN 7300-91-6

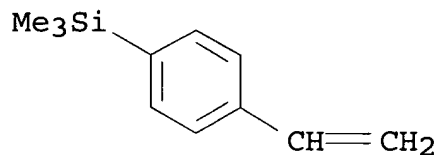
CMF C10 H7 N O3



CM 2

CRN 1009-43-4

CMF C11 H16 Si



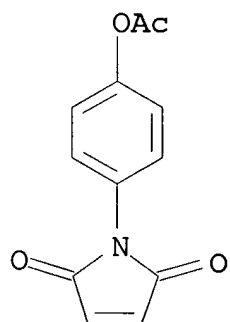
RN 152590-58-4 HCAPLUS

CN 1H-Pyrrole-2,5-dione, 1-[4-(acetyloxy)phenyl]-, polymer with  
(4-ethenylphenyl)trimethylsilane (9CI) (CA INDEX NAME)

CM 1

CRN 6637-46-3

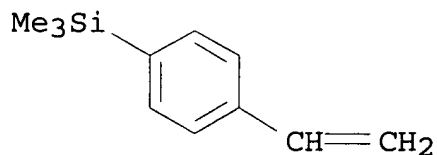
CMF C12 H9 N O4



CM 2

CRN 1009-43-4

CMF C11 H16 Si

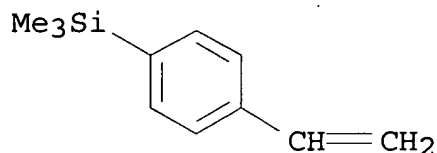


RN 152590-59-5 HCAPLUS

CN 1H-Pyrrole-2,5-dione, polymer with (4-ethenylphenyl)trimethylsilane  
(9CI) (CA INDEX NAME)

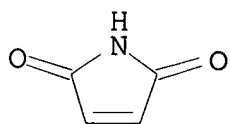
CM 1

CRN 1009-43-4  
CMF C11 H16 Si



CM 2

CRN 541-59-3  
CMF C4 H3 N O2



CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

ST silylstyrene maleimide polymer **photoresist lithog**  
; integrated circuit UV **resist** silyl polymer

IT Electric circuits  
(integrated, novel silylstyrene-maleimide copolymers for **lithog.** fabrication of)

IT **Resists**  
(photo-, novel silylstyrene-maleimide copolymers for)

IT 5610-94-6  
RL: USES (Uses)  
(**photoresist** contg. silylstyrene-maleimide copolymer and, **lithog.** properties of)

IT 25657-77-6 25721-75-9 56891-47-5 71495-65-3 120382-26-5  
152590-63-1 152590-64-2 152590-65-3 152590-66-4 152590-67-5  
152590-68-6 152590-69-7 152590-70-0 152590-71-1  
RL: USES (Uses)  
(**photoresist** contg., characteristics of, in comparison with silylstyrene-maleimide copolymers)

IT 1009-43-4 17920-24-0, p-Trimethylsilyl- $\alpha$ -methylstyrene  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(polymn. of, with maleimide derivs., for **photoresists** applications)

- IT 6637-46-3, N-(p-Acetoxyphenyl)maleimide 28173-23-1,  
N-(4-Hydroxyphenyl)maleamic acid  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(polymn. of, with silylstyrene monomers, for **photoresists**  
applications)
- IT 133624-55-2P 152590-58-4P 152590-59-5P  
152590-60-8P 152590-61-9P 152590-62-0P  
RL: PREP (Preparation)  
(prepn. and **lithog.** properties of **photoresist**  
contg., for integrated circuit fabrications)
- L30 ANSWER 16 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN  
1993:681992 Document No. 119:281992 Synthesis and polymerizations of  
N-(tert-butoxy)maleimide and characteristic properties of its  
polymers for application as chemical amplification **resists**  
. Ahn, Kwang Duk; Koo, Deok Il (Funct. Polym. Lab., Korea Inst.  
Sci. Technol., Seoul, 130-650, S. Korea). Polymeric Materials  
Science and Engineering, 66, 249-50 (English) 1992. CODEN: PMSEDG.  
ISSN: 0743-0515.
- AB A novel protected maleimide monomer, N-(tert-butoxy)maleimide  
(t-BuOMI) was prepd. by a retro-Diels Alder reaction. The monomer  
t-BuOMI was copolymd. with styrene derivs. such as  
p-(tert-butoxycarbonyloxy)styrene (t-BOCSt), p-trimethylsilylstyrene  
(SiSt), p-methylstyrene (MeSt), p-chlorostyrene (ClSt), and  
p-acetoxystyrene (AcOSt) in presence of radical initiator. The  
alternating copolymer of t-BuOMI and t-BOCSt, P(t-BuOMI/t-BOCSt)  
exhibits two-step thermal deprotection behavior; in the first step  
the deprotection of t-BOCSt units occurs at 185°, and  
P(t-BuOMI/t-BOCSt) is converted to P(t-BuOMI/HOSt) evolving  
isobutylene and CO<sub>2</sub>. In the second deprotection at 252°  
P(t-BuOMI/HOSt) is converted to P(HOMI/HOSt) which does not show T<sub>g</sub>  
before its main-chain decompn. All the protected copolymers are  
deprotected at .apprx.270° or above and the deprotected  
polymers with HOMI (HOMI = N-hydroxymaleimide) units have high T<sub>g</sub>'s  
of .apprx.245° or no T<sub>g</sub> obsd. The copolymers t-BuOMI are  
white powders having a good film forming property. P(t-BuOMI/St) is  
very sol. in common org. solvents such as chloroform, anisole,  
toluene and DMF but insol. in aq. base solns. and methanol. Instead  
the deprotected polymer P(HOMI/St) is sol. in aq. base solns., DMF  
and dioxane, whereas it is insol. in common org. solvents such as  
chloroform, anisole and toluene due to the large polarity change.  
The acidolytic deprotection of tert-Bu groups of P(t-BuOMI/St) was  
detected at 130° or lower temps. in the presence of  
p-toluenesulfonic acid that indicates capability of the polymer as a  
chem. amplified **resist**. In the preliminary **resist**  
evaluation of P(t-BuOMI/St) contg. onium salt, submicron pos.  
patterns were obtained by deep-UV or electron beam irradiation followed  
by post exposure baking at 130° and development with aq.

base.

IT 151543-81-6P

RL: FORM (Formation, nonpreparative); PREP (Preparation)  
 (formation of, in thermal reaction of butoxymaleimide-contg.  
 precursor, for lithog. chem. amplification  
 photoresist applications)

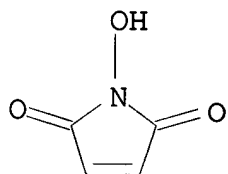
RN 151543-81-6 HCAPLUS

CN 1H-Pyrrole-2,5-dione, 1-hydroxy-, polymer with (4-  
 ethenylphenyl)trimethylsilane (9CI) (CA INDEX NAME)

CM 1

CRN 4814-74-8

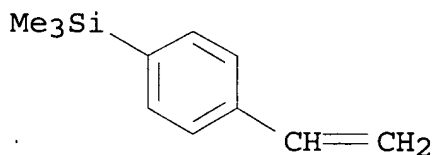
CMF C4 H3 N O3



CM 2

CRN 1009-43-4

CMF C11 H16 Si



IT 151543-74-7P, N-(tert-Butoxy)maleimide-p-  
 trimethylsilylstyrene copolymer

RL: PRP (Properties); PREP (Preparation)  
 (prepn. and thermal properties of, for lithog. chem.  
 amplification photoresist applications)

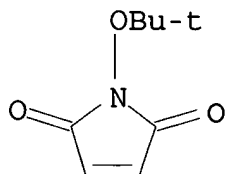
RN 151543-74-7 HCAPLUS

CN 1H-Pyrrole-2,5-dione, 1-(1,1-dimethylethoxy)-, polymer with  
 (4-ethenylphenyl)trimethylsilane (9CI) (CA INDEX NAME)

CM 1

CRN 151407-57-7

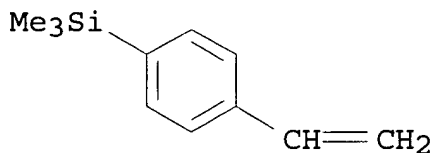
CMF C8 H11 N O3



CM 2

CRN 1009-43-4

CMF C11 H16 Si



CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

ST butoxymaleimide styrene deriv polymer **photoresist**

**lithog**

IT **Resists**

(photo-, chem. amplification, tert-butoxymaleimide polymers with styrene derivs. for)

IT 26983-56-2P 30945-90-5P 151543-79-2P 151543-80-5P

**151543-81-6P** 151543-82-7P 151543-83-8P 151543-84-9P

151543-85-0P

RL: FORM (Formation, nonpreparative); PREP (Preparation)

(formation of, in thermal reaction of butoxymaleimide-contg. precursor, for **lithog**. chem. amplification **photoresist** applications)

IT 151543-72-5P, N-(tert-Butoxy)maleimide-styrene copolymer

RL: PREP (Preparation)

(prepn. and **lithog**. characteristics of chem. amplification **photoresist** contg.)

IT 151407-57-7P, N-(tert-Butoxy)maleimide

RL: SPN (Synthetic preparation); PREP (Preparation)

(prepn. and polymns. of, with styrene derivs., for **lithog**. chem. amplification **photoresist** applications)

IT 151543-73-6P, N-(tert-Butoxy)maleimide-p-(tert-



butoxycarbonyloxy)styrene copolymer **151543-74-7P**,  
N-(tert-Butoxy)maleimide-p-trimethylsilylstyrene copolymer  
151543-75-8P, N-(tert-Butoxy)maleimide-p-acetoxystyrene copolymer  
151543-76-9P, N-(tert-Butoxy)maleimide-p-methylstyrene copolymer  
151543-77-0P, N-(tert-Butoxy)maleimide-p-chlorostyrene copolymer  
151543-78-1P

RL: PRP (Properties); PREP (Preparation)  
(prepn. and thermal properties of, for **lithog.** chem.  
amplification **photoresist** applications)

L30 ANSWER 17 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN

1993:671834 Document No. 119:271834 **Photoresist** materials  
based on organometallic-containing polysulfones. Kim, Seong Ju;  
Kim, Ji Hong; Lee, Dae Youp; Ko, Young Hoon; Park, Byung Sun; Park,  
Chun Geun (Korea Kumho Petrochem. Co., Ltd., Yecheon, 555-210, S.  
Korea). Molecular Crystals and Liquid Crystals Science and  
Technology, Section A: Molecular Crystals and Liquid Crystals  
317-24 (English) 1993. CODEN: MCLCE9. ISSN: 1058-725X.

AB Sol. 1:1 alternating copolymers of p-tert-butylstyrene,  
p-(trimethylsilyl)styrene, p-(trimethylgermyl)styrene, and  
(3-vinylbenzyl)trimethylsilane with SO<sub>2</sub> were prepd. by  
tert-butylhydroperoxide-initiated copolymn. below -60°. The  
O plasma etch resistance of poly[p-(trimethylgermyl)styrene sulfone]  
**resist** is higher than that of poly[p-(trimethylsilyl)styrene  
sulfone] **resist** by a factor of 4.5, and that of  
cresol-novolac by a factor of 9. Among the polysulfone  
**resists**, poly[p-(trimethylgermyl)styrene sulfone] shows the  
best **lithog.** characteristics.

IT **151678-50-1P**

RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. and **photoresist** properties of)

RN 151678-50-1 HCAPLUS

CN Silane, (4-ethenylphenyl)trimethyl-, polymer with sulfur dioxide,  
alternating (9CI) (CA INDEX NAME)

CM 1

CRN 7446-09-5

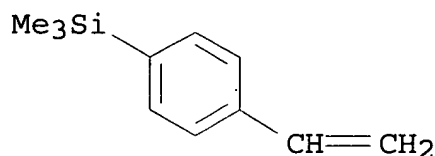
CMF 02 S

O=S=O

CM 2

CRN 1009-43-4

CMF C11 H16 Si



- CC 35-4 (Chemistry of Synthetic High Polymers)  
Section cross-reference(s): 74
- ST organometallic polysulfone **photoresist** material;  
germylstyrene polysulfone **photoresist** material;  
silylstyrene polysulfone **photoresist** material
- IT **Resists**  
(photo-, patterning of, germyl and silyl group-contg.  
styrene-based polysulfones in)
- IT Polysulfones, preparation  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(styrene-based, germyl and silyl group-contg., prepn. and  
**photoresist** properties of)
- IT 151678-49-8P **151678-50-1P** · 151678-51-2P 151678-52-3P  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. and **photoresist** properties of)
- L30 ANSWER 18 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN  
1993:613867 Document No. 119:213867 Preparation and properties of  
silicon-containing copolymer for near-UV **resist**. III.  
Maleimide/silyl-styrene copolymer. Chiang, Wen Yen; Lu, Jin Yuh  
(Dep. Chem. Eng., Tatung Inst. Technol., Taipei, 10451, Taiwan).  
Journal of Applied Polymer Science, 49(5), 893-99 (English) 1993.  
CODEN: JAPNAB. ISSN: 0021-8995.
- AB Poly(maleimide-p-trimethylsilyl- $\alpha$ -methylstyrene) (I) and  
poly(maleimide-p-trimethylsilyl-styrene) (II) were synthesized for  
pos./neg. near-UV **resists** contg. diazonaphthoquinone  
sulfonate (DNS). The electron-rich styrenic monomers tend to  
undergo alternating copolymer. with an electron-poor maleimide  
monomer. The chain-stiffening effects of the maleimide and  
 $\alpha$ -methylstyrene group were responsible for high thermal  
stabilities. A higher glass transition temp. of 226° was  
found in I. **Lithog.** pos./neg. images were obtained that  
were stable at >200°. Excellent soly. in aq. base was obsd.  
with II at 10.3 wt % silicon content and an oxygen-plasma etching  
rate of 1:12 compared to hard-baked HPR-204.
- IT **150883-77-5P 150883-81-1P**  
RL: PREP (Preparation)  
(prepn. and **lithog.** characterization of

**photoresist contg.)**

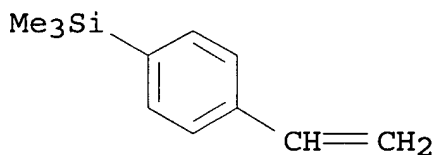
RN 150883-77-5 HCAPLUS

CN 1H-Pyrrole-2,5-dione, polymer with (4-ethenylphenyl)trimethylsilane,  
alternating (9CI) (CA INDEX NAME)

CM 1

CRN 1009-43-4

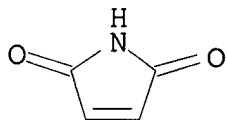
CMF C11 H16 Si



CM 2

CRN 541-59-3

CMF C4 H3 N O2



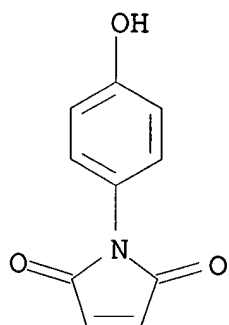
RN 150883-81-1 HCAPLUS

CN 1H-Pyrrole-2,5-dione, 1-(4-hydroxyphenyl)-, polymer with  
(4-ethenylphenyl)trimethylsilane, alternating (9CI) (CA INDEX NAME)

CM 1

CRN 7300-91-6

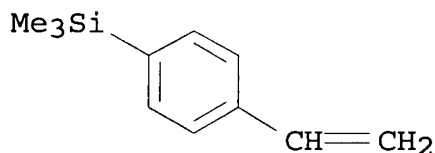
CMF C10 H7 N O3



CM 2

CRN 1009-43-4

CMF C11 H16 Si



CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

ST maleimide silylstyrene copolymer **photoresist lithog**; styrene maleimide methylsilyl polymer **photoresist lithog**

IT **Resists**  
(photo-, silicon-contg. maleimide/styrene copolymers)

IT 5610-94-6  
RL: USES (Uses)  
(**lithog. photoresist** contg. maleimide/silyl-styrene copolymer and)

IT 119591-62-7P 139440-21-4P 150883-76-4P **150883-77-5P**  
150883-78-6P 150883-79-7P 150883-80-0P **150883-81-1P**  
RL: PREP (Preparation)  
(prepn. and **lithog.** characterization of **photoresist** contg.)

L30 ANSWER 19 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN  
1993:214078 Document No. 118:214078 Preparation and properties of silicon-containing copolymers for near-UV **resists**. II.  
Poly[(N-(4-hydroxyphenyl)maleimide)-alt-(p-trimethylsilyl- $\alpha$ -

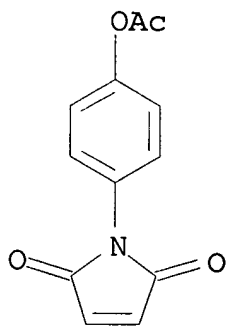
methylystyrene)]. Chiang, Wen Yen; Lu, Jin Yuh (Dep. Chem. Eng., Tatung Inst. Technol., Taipei, 10451, Peop. Rep. China). Angewandte Makromolekulare Chemie, 205, 75-90 (English) 1993. CODEN: ANMCBO. ISSN: 0003-3146.

- AB Alternating (N-(4-hydroxyphenyl)maleimide) (I)-(p-trimethylsilyl- $\alpha$ -methylstyrene) copolymer and several related I-p- $\alpha$ -methylstyrene copolymers were synthesized for novel pos. near-UV **resists** contg. diazonaphthoquinone sulfonate. The chain-stiffening effect (high glass transition temp., Tg) of the maleimide group was responsible for high thermal resistance. Thus, a Tg of 240° and thermal decompn. temp. of 425° were obtained. **Lithog.** pos. images were obtained which resisted thermal deformation at 250°. The prepd. silicon-contg. **resists** were also used as the top imaging layer of a bilayer **resist** for microlithog. application.
- IT **147554-71-0DP**, hydrolyzed  
RL: PEP (Physical, engineering or chemical process); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)  
(prepn. and characterization of, for near-UV **resists**)
- RN 147554-71-0 HCAPLUS
- CN 1H-Pyrrole-2,5-dione, 1-[4-(acetyloxy)phenyl]-, polymer with (4-ethenylphenyl)trimethylsilane, alternating (9CI) (CA INDEX NAME)

CM 1

CRN 6637-46-3

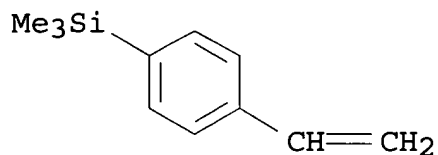
CMF C12 H9 N O4



CM 2

CRN 1009-43-4

CMF C11 H16 Si



IT 147554-71-0P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation);  
RACT (Reactant or reagent)  
(prepn. and hydrolysis of)

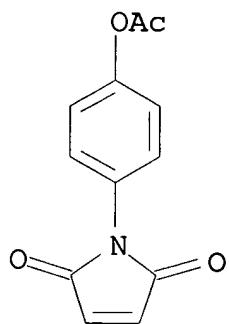
RN 147554-71-0 HCAPLUS

CN 1H-Pyrrole-2,5-dione, 1-[4-(acetyloxy)phenyl]-, polymer with  
(4-ethenylphenyl)trimethylsilane, alternating (9CI) (CA INDEX NAME)

CM 1

CRN 6637-46-3

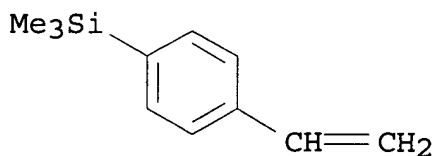
CMF C12 H9 N O4



CM 2

CRN 1009-43-4

CMF C11 H16 Si



CC 37-3 (Plastics Manufacture and Processing)

- Section cross-reference(s): 35, 38, 74
- ST hydroxyphenylmaleimide trimethylsilylmethylstyrene copolymer  
photochem **resist**; silicon contg copolymer  
**photoresist**
- IT Heat-resistant materials  
(alternating (hydroxyphenyl)maleimide-  
(trimethylsilylmethylstyrene) copolymer, prepn. and  
characterization of, for near-UV **resists**)
- IT Glass temperature and transition  
(of alternating (hydroxyphenyl)maleimide-  
(trimethylsilylmethylstyrene) copolymer, thermal resistance and  
applications for near-UV **resists** in relation to)
- IT **Lithography**  
(pos. images in, from alternating (hydroxyphenyl)maleimide-  
(trimethylsilylmethylstyrene) copolymer)
- IT **Resists**  
(photo-, UV, near-, from alternating (hydroxyphenyl)maleimide-  
(trimethylsilylmethylstyrene) copolymer, prepn. and  
characterization of)
- IT 53351-57-8  
RL: USES (Uses)  
(alternating (hydroxyphenyl)maleimide-  
(trimethylsilylmethylstyrene) copolymer contg., **lithog.**  
behavior of)
- IT 147554-70-9DP, hydrolyzed **147554-71-0DP**, hydrolyzed  
RL: PEP (Physical, engineering or chemical process); SPN (Synthetic  
preparation); PREP (Preparation); PROC (Process)  
(prepn. and characterization of, for near-UV **resists**)
- IT 131789-36-1P 147554-70-9P **147554-71-0P** 147554-72-1P  
147554-73-2P 147554-74-3P  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation);  
RACT (Reactant or reagent)  
(prepn. and hydrolysis of)
- L30 ANSWER 20 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN  
1992:604184 Document No. 117:204184 Line **resist** pattern  
formation. Hanawa, Tetsuo (Mitsubishi Denki K. K., Japan). Jpn.  
Kokai Tokyo Koho JP 04057051 A2 19920224 Heisei, 9 pp. (Japanese).  
CODEN: JKXXAF. APPLICATION: JP 1990-170465 19900627.
- AB In patterning a **photoresist** based on a base resin, a  
crosslinking agent, and an acid generator by using an excimer laser  
or an electron beam, the **resist** chem. enhanced by  
incorporating Si in the base resin and(or) the acid generator is  
coated on a planarized resin layer in the substrate, imagewise  
exposed, and developed to form a pattern which serves as a mark for  
anisotropic O plasma etching. High resolu. **resist**  
patterns can be obtained.
- IT **144057-76-1**

RL: ANST (Analytical study)  
(**photoresist** compn. contg.)

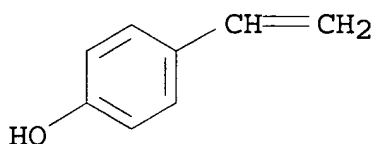
RN 144057-76-1 HCAPLUS

CN Phenol, 4-ethenyl-, polymer with (4-ethenylphenyl)trimethylsilane  
(9CI) (CA INDEX NAME)

CM 1

CRN 2628-17-3

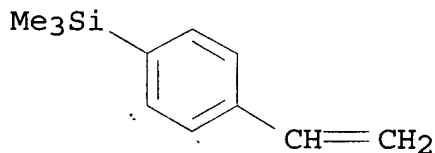
CMF C8 H8 O



CM 2

CRN 1009-43-4

CMF C11 H16 Si



IC ICM G03F007-26

ICS G03F007-075; H01L021-027; H01L021-302

CC 79-5 (Inorganic Analytical Chemistry)

Section cross-reference(s): 76

ST **photoresist** high resolu. patterning; silicon

**photoresist** chem enhancement; micro electronics

**photoresist** patterning

IT Semiconductor devices

(fabrication of, high resolu. **resist** patterning for)

IT **Resists**

(photo-, chem.-enhanced, for high resolu.)

IT 66003-78-9, Triphenylsulfonium trifluoromethanesulfonate

RL: ANST (Analytical study)

(acid generator, high resolu. **photoresist** compn.  
contg.)

IT 66003-78-9D, Triphenylsulfonium trifluoromethanesulfonate,



trialkylsilyl-substituted  
RL: ANST (Analytical study)  
(acid generator, **photoresist** compn. contg.)

IT 24979-70-2  
RL: ANST (Analytical study)  
(base resin, **photoresist** compn. contg.)

IT 108-78-1D, Melamine, alkoxyethyl derivs.  
RL: MOA (Modifier or additive use); USES (Uses)  
(crosslinking agent, high resolu. **photoresist** compn. contg.)

IT 144057-76-1  
RL: ANST (Analytical study)  
(**photoresist** compn. contg.)

L30 ANSWER 21 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN  
1992:141556 Document No. 116:141556 Dry etching process for  
fabrication of optoelectronic gratings in III-V substrates. Gozdz,  
A. S.; Shelburne, J. A., III; Robinson, R. S.; Chang, C. C.  
(Bellcore, Red Bank, NJ, 07701, USA). Electronics Letters, 27(24),  
2270-1 (English) 1991. CODEN: ELLEAK. ISSN: 0013-5194.

AB A novel, 3-step dry etching process for the fabrication of  
first-order diffraction gratings in III-V semiconductors is  
reported. The process takes advantage of the etching of thin films  
of SiO<sub>2</sub> and of a sensitive, organosilicon electron-beam  
**resist** by the H<sub>2</sub>/CH<sub>4</sub> plasma. It reduces wafer handling and  
eliminates wet stripping of the **resist**. The gratings were  
imaged with a scanning tunneling microscope.

IT 113032-02-3, Poly(p-trimethylsilylstyrene sulfone)  
RL: PRP (Properties)  
(electron **resists** from, etching of, for optoelectronic  
gratings)

RN 113032-02-3 HCAPLUS  
CN Silane, (4-ethenylphenyl)trimethyl-, polymer with sulfur dioxide  
(9CI) (CA INDEX NAME)

CM 1

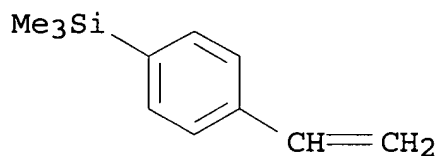
CRN 7446-09-5  
CMF 02 S

O=S=O

CM 2

CRN 1009-43-4

CMF C11 H16 Si



- CC 76-5 (Electric Phenomena)  
Section cross-reference(s): 73
- ST optoelectronic grating etching silica; **resist** etching  
optoelectronic grating
- IT Diffraction gratings  
(etching of silica in electron **resists** for)
- IT Etching  
(of electron **resists** in optoelectronic grating  
fabrication)
- IT Sputtering  
(etching, of electron **resists** in optoelectronic grating  
fabrication)
- IT Etching  
(sputter, of electron **resists** in optoelectronic grating  
fabrication)
- IT **113032-02-3**, Poly(p-trimethylsilylstyrene sulfone)  
RL: PRP (Properties)  
(electron **resists** from, etching of, for optoelectronic  
gratings)
- IT 100042-90-8  
RL: PRP (Properties)  
(electron **resists** from, for optoelectronic grating  
fabrication)
- IT 74-82-8, Methane, uses 1333-74-0, Hydrogen, uses 7664-39-3,  
Hydrofluoric acid, uses 7782-44-7, Oxygen, uses  
RL: USES (Uses)  
(in etching of electron **resists** for optoelectronic  
grating fabrication)
- L30 ANSWER 22 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN  
1991:570704 Document No. 115:170704 Dissolution inhibition mechanism  
of ANR **photoresists**: crosslinking versus hydroxyl site  
consumption. Thackeray, J. W.; Orsula, G. W.; Rajaratnam, M. M.;  
Sinta, R.; Herr, D.; Pavelchek, E. (Shipley Co., Inc., Newton, MA,  
02162, USA). Proceedings of SPIE-The International Society for  
Optical Engineering, 1466(Adv. Resist Technol. Process. 8), 39-52  
(English) 1991. CODEN: PSISDG. ISSN: 0277-786X.
- AB Crosslinking of phenolic resins with melamines were studied through

<sup>1</sup>H and <sup>13</sup>C NMR, gel permeation chromatog. (GPC) and dissoln. rate changes. For the NMR studies, model phenolic compds. were used such as 4-ethylphenol, and the hexafunctional crosslinker, hexamethoxymethylmelamine. The NMR clearly reveals that the crosslinking reaction occurs quant. at the hydroxyl site of the phenol. This result raises the question of whether the dissoln. inhibition obsd. in the ANR **resists** is due to -OH site consumption or to the rapid rise in mol. wt. of the phenolic polymer. Comparison of THF extn. vs. aq. tetramethylammonium hydroxide (TMAH) development shows that the dose required to insolubilize the **resist** is much higher for THF. GPC on the sol. fraction extd. into THF showed a fraction with mol. wts. up to 400,000 Daltons. Crosslinking and -OH site protection is thought to provide synergistic dissoln. selectivity in TMAH, leading to high contrast and high resolu. The results are presented on the effect of  $\chi$ , which is proportional to the ratio of phenolic hydroxyl groups to melamine methoxy groups, on the **lithog.** performance of ANR **photoresists**. At low  $\chi$ , the deep-UV **resists** can be used as increased absorption **resists** over topog., and development times can be shortened significantly. Increasing the melamine loading can lessen the degree of bridging residue obsd. between lines.

IT 136541-34-9

RL: USES (Uses)

(dissoln. inhibition of **photoresists** from, for advanced neg.-working **resist** formulation, NMR studies in)

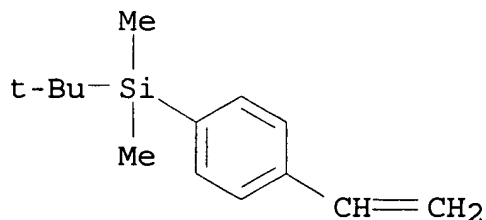
RN 136541-34-9 HCAPLUS

CN Phenol, 4-ethenyl-, polymer with (1,1-dimethylethyl) (4-ethenylphenyl)dimethylsilane (9CI) (CA INDEX NAME)

CM 1

CRN 136541-33-8

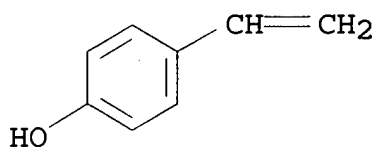
CMF C14 H22 Si



CM 2

CRN 2628-17-3

CMF C8 H8 O



- CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
- ST neg **photoresist** dissoln inhibition mechanism; phenolic resin crosslinking melamine **resist** development; **photolithog photoresist** development dissoln inhibition mechanism
- IT **Resists**  
 (photo-, UV, neg.-working, dissoln. inhibition mechanism for, crosslinking of phenolic resins with melamines in)
- IT 123141-74-2, SNR 248  
 RL: USES (Uses)  
 (advanced neg.-working **resist** development and comparison with, dissoln. inhibition mechanism in)
- IT 3089-11-0, Hexamethoxymethylmelamine  
 RL: USES (Uses)  
 (crosslinker, of phenolic resins, in development of neg.-working **photoresists**)
- IT **136541-34-9**  
 RL: USES (Uses)  
 (dissoln. inhibition of **photoresists** from, for advanced neg.-working **resist** formulation, NMR studies in)
- IT 123-07-9, 4-Ethylphenol  
 RL: USES (Uses)  
 (model phenolic compd. for **photoresists**, NMR studies of crosslinking with melamines in)
- IT 109-99-9, Tetrahydrofuran, uses and miscellaneous  
 RL: USES (Uses)  
 (**photoresist** developer from, in comparison with tetramethylammonium hydroxide)
- IT 136511-57-4, XP 89114  
 RL: USES (Uses)  
 (**photoresist** developer soln. of, dissoln. inhibition mechanism studies in)
- IT 75-59-2, MF 321 123-86-4, N-Butylacetate  
 RL: USES (Uses)  
 (**photoresist** developer, dissoln. inhibition mechanism studies in)
- IT 75-59-2, Tetramethylammonium hydroxide

RL: USES (Uses)

(**photoresist** development with solns. contg., dissoln. inhibition mechanism studies in)

L30 ANSWER 23 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN

1991:196210 Document No. 114:196210 Preparation and properties of silicon-containing copolymer for near-UV **resist**. I. Poly(N-(4-hydroxyphenyl)maleimide-alt-p-trimethylsilylstyrene). Chiang, Wen Yen; Lu, Jin Yuh (Dep. Chem. Eng., Tatung Inst. Technol., Taipei, 10451, Taiwan). Journal of Polymer Science, Part A: Polymer Chemistry, 29(3), 399-410 (English) 1991. CODEN: JPACEC. ISSN: 0887-624X.

AB A neg. near-UV **photoresist** consisting of poly(N-(4-hydroxyphenyl)maleimide-alt-p-trimethylsilylstyrene) (PHMS) and a naphthoquinonediazide ester was developed. PHMS was synthesized by soln. free-radical polymn. of the comonomers with azobisisobutyronitrile (AIBN) in 1,4-dioxane at 60°. The prepn. of PHMS in terms of reaction time, thermal initiator, and solvent was evaluated, and a series of different mol. wt. copolymers were prepd. PHMS was 1:1 in compn. and was predominantly alternating. These copolymers dissolved in a wide range of solvents (including 5% tetramethylammonium hydroxide). The thermal properties of these copolymers were investigated by DSC and TGA. The chain-stiffening effect of the maleimide group played an important role in effecting high thermal resistance. Near-UV exposure was carried out using a Canon PLA-501F contact printer. High resoln. neg. images were obtained which had resistance to thermal deformation at 330° and above. The developed patterns exhibited good adhesion to the Si substrates without the use of an adhesion promoter. The **lithog.** applications of a bilayer **photoresist** system in which the prepd. **resist** was used as the top imaging layer were examd. If PHMS is used as a binder for a diazonaphthoquinone sulfonate (NDS), photochem., pos. images should be obtained; however, on the contrary, neg. images were obsd. It is proposed that photocrosslinking occurred in the PHMS main chain.

IT 133624-55-2P, N-(4-Hydroxyphenyl)maleimide-p-trimethylsilylstyrene polymer

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)

(prepn. and properties of, for near-UV **resists**)

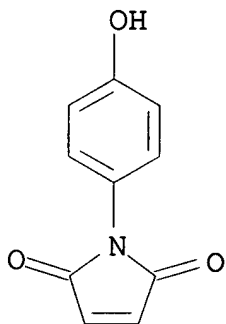
RN 133624-55-2 HCAPLUS

CN 1H-Pyrrole-2,5-dione, 1-(4-hydroxyphenyl)-, polymer with (4-ethenylphenyl)trimethylsilane (9CI) (CA INDEX NAME)

CM 1

CRN 7300-91-6

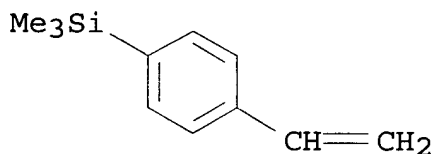
CMF C10 H7 N O3



CM 2.

CRN 1009-43-4

CMF C11 H16 Si



CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

ST silicon contg polymer **photoresist** near UV;  
hydroxyphenylmaleimide methylsilylstyrene polymer  
**photoresist**

IT **Resists**  
(photo-, near-UV, prepn. and properties of silicon-contg.  
copolymer for)

IT **133624-55-2P**, N-(4-Hydroxyphenyl)maleimide-p-  
trimethylsilylstyrene polymer

RL: PRP (Properties); SPN (Synthetic preparation); PREP  
(Preparation)

(prepn. and properties of, for near-UV **resists**)

L30 ANSWER 24 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN

1991:63017 Document No. 114:63017 Copolymer from sulfur dioxide and  
vinyl compounds and their use as **resists**. Matsuda, Minoru  
(Chisso Corp., Japan). U.S. US 4965340 A 19901023, 14 pp. Cont. of  
U.S. Ser. No. 59,927, abandoned. (English). CODEN: USXXAM.

APPLICATION: US 1989-297487 19890117. PRIORITY: US 1987-59927 19870609.

AB The title polymers (mol. wt. 500-500,000) contain 1-50% SO<sub>2</sub> repeating units and 50-99% repeating units from (1) chlorostyrene (I), acetoxystyrene (II), hydroxystyrene (III), and/or trialkylsilylstyrene (IV) and (2) styrene, I, II, III, IV, 1-butene, 2-methylbutene, 2-methylpentene, trimethylvinylsilane, and/or trimethylallylsilane, in which the monomers from (1) and (2) are different. p-Trimethylsilylstyrene 5.1, AIBN 0.040, 1-butene 16.5 g, and SO<sub>2</sub> (-10°) 13.0 mL were polymd. at 50° for 24 h, giving 1.9 g polymer contg. p-trimethylstyrene 17, 1-butene 38, and SO<sub>2</sub> 45% and having mol. wt. 168,000. A 0.48 µm coating of the polymer was exposed to 10 keV electron beam to decomp. it, leaving a pattern with good etching resistance.

IT 117057-25-7P 131930-56-8P

RL: PREP (Preparation)

(prepn. of, as **resists**)

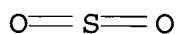
RN 117057-25-7 HCAPLUS

CN Silane, (4-ethenylphenyl)trimethyl-, polymer with 1-butene and sulfur dioxide (9CI) (CA INDEX NAME)

CM 1

CRN 7446-09-5

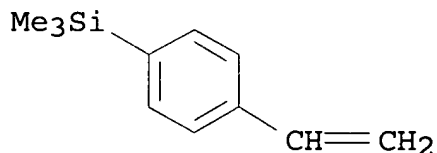
CMF O2 S



CM 2

CRN 1009-43-4

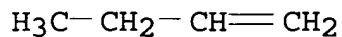
CMF C11 H16 Si



CM 3

CRN 106-98-9

CMF C4 H8



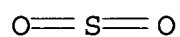
RN 131930-56-8 HCAPLUS

CN Silane, (4-ethenylphenyl)trimethyl-, polymer with 2-methyl-1-pentene and sulfur dioxide (9CI) (CA INDEX NAME)

CM 1

CRN 7446-09-5

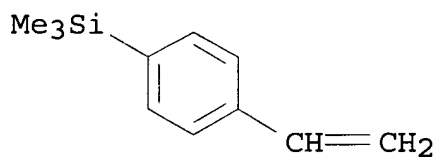
CMF O2 S



CM 2

CRN 1009-43-4

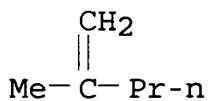
CMF C11 H16 Si



CM 3

CRN 763-29-1

CMF C6 H12



IC ICM C08G075-00

INCL 528382000

CC 35-4 (Chemistry of Synthetic High Polymers)



Section cross-reference(s): 74

ST sulfur dioxide vinyl compd copolymer; polysulfone pos **resist**  
; electron beam sensitive **resist**

IT **Resists**

(pos.-working, sulfur dioxide-vinyl compd. polysulfones for)

IT Polysulfones, preparation

RL: PREP (Preparation)

(sulfur dioxide-based, prepn. of, as **resists**)

IT **117057-25-7P 131930-56-8P**

RL: PREP (Preparation)

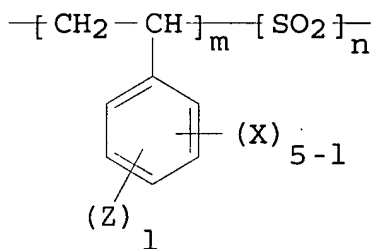
(prepn. of, as **resists**)

L30 ANSWER 25 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN

1990:523896 Document No. 113:123896 Positive-type **resist**

materials and pattern formation. Takechi, Satoshi; Nakamura, Hiroko; Kodachi, Akiko (Fujitsu Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 02103545 A2 19900416 Heisei, 4 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1988-256021 19881013.

GI



AB A pos.-working **resist** is a copolymer comprised of SO<sub>2</sub> and a styrene deriv. substituted with a group contg.  $\geq 1$  Si I (X = H, alkyl; Z = SiMe<sub>3</sub>, NH(SiMe<sub>3</sub>)<sub>2</sub>, N(SiMe<sub>3</sub>)<sub>3</sub>;  $l \geq 1$ ) and used as an upper layer **resist** in a bilayer **resist** for patterning in semiconductor device fabrication. Thus, SO<sub>2</sub> and p-trimethylsilylstyrene were polymd. to give an electron-beam sensitive **resist** that gave a precise pattern by electron-beam exposure and THF development.

IT **113032-02-3**

RL: USES (Uses)

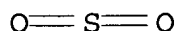
(electron-beam pos.-working **resist**, for upper layer in bilayer patterning)

RN 113032-02-3 HCAPLUS

CN Silane, (4-ethenylphenyl)trimethyl-, polymer with sulfur dioxide (9CI) (CA INDEX NAME)

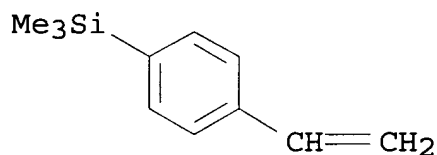
CM 1

CRN 7446-09-5  
CMF 02 S



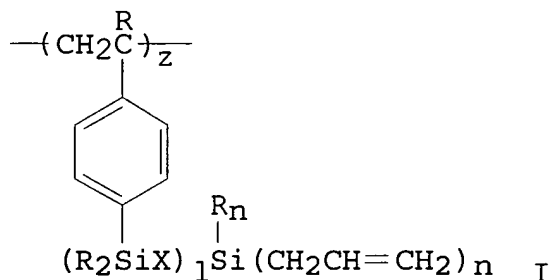
CM 2

CRN 1009-43-4  
CMF C11 H16 Si



IC ICM G03F007-039  
ICS G03F007-075  
CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)  
ST styrene sulfone copolymer upper **resist**; semiconductor patterning **resist** bilayer  
IT Semiconductor devices  
(silyl group-contg. styrene-sulfone copolymer electron-beam **resist** for fabrication of)  
IT **Resists**  
(electron-beam, pos.-working, silyl group-contg. styrene-sulfone copolymer as, for bilayer patterning)  
IT **113032-02-3** 129258-76-0  
RL: USES (Uses)  
(electron-beam pos.-working **resist**, for upper layer in bilayer patterning)  
  
L30 ANSWER 26 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN  
1989:487436 Document No. 111:87436 Styrene polymers containing silicon atom and allyl group, compositions containing them for **photoresists**, and method for their use for pattern forming. Saigo, Kazuhide (NEC Corp., Japan). Jpn. Kokai Tokkyo Koho JP 63258909 A2 19881026 Showa, 22 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1986-2458 19860109. PRIORITY: JP 1985-1636 19850109; JP 1985-1637 19850109; JP 1985-270342 19851129.

GI



AB The title polymers highly sensitive to UV, forming high-resoln. patterns with good dry etching resistance contain both Si atom and allyl group in the structural unit, e.g., I [R = H, lower alkyl; X = O, (CH<sub>2</sub>)<sub>p</sub>; 1 ≥ 0; n = 0-2; n = 1-3; (n + m) = 3; p, z = integer], and pattern forming involves selective coverage of the **resist** layer on an org. film on a substrate, followed by selective etching using the **resist** as **mask**.

IT 121915-57-9P

RL: PREP (Preparation)  
(manuf. of, for **photoresists**)

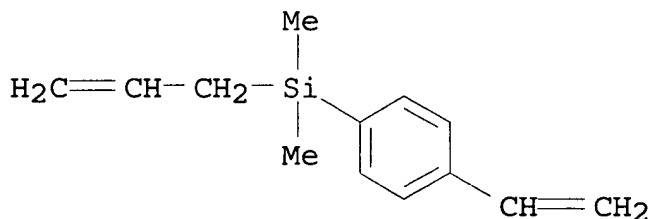
RN 121915-57-9 HCAPLUS

CN Silane, (4-ethenylphenyl)dimethyl-2-propenyl-, homopolymer (9CI)  
(CA INDEX NAME)

CM 1

CRN 18052-72-7

CMF C13 H18 Si



IC ICM C08F112-14

ICS C08K005-28; C08L025-18; G03C001-68; G03C001-71

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

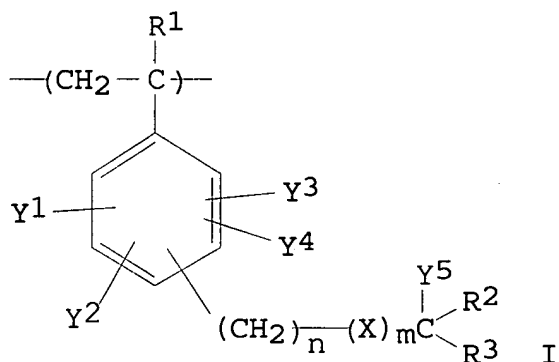
Section cross-reference(s): 35

ST allylsilylstyrene polymer **photoresist**

IT 102814-53-9P 115577-94-1P 121915-57-9P 121915-59-1P  
 121915-61-5P  
 RL: PREP (Preparation)  
 (manuf. of, for **photoresists**)

L30 ANSWER 27 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN  
 1989:431353 Document No. 111:31353 Photocrosslinkable  
 fluorine-containing styrene polymers with low refractive index.  
 Matsui, Kyohide; Ishihara, Kazuhiko; Kogure, Riiko (Sagami Chemical  
 Research Center, Japan). Jpn. Kokai Tokkyo Koho JP 01009207 A2  
 19890112 Heisei, 20 pp. (Japanese). CODEN: JKXXAF. APPLICATION:  
 JP 1988-19621 19880201. PRIORITY: JP 1987-21699 19870203.

GI



AB The title polymers useful for optical fiber sheath and neg.-working **photoresists** have the general formula I (R1 = H, lower alkyl; R2 = H, lower polyfluoroalkyl; R3 = polyfluoroalkyl with or without ether linkages; X = O, SiR4R5; R4, R5 = lower alkyl; Y1-Y5 = H, halogen; n, m = 0, 1).

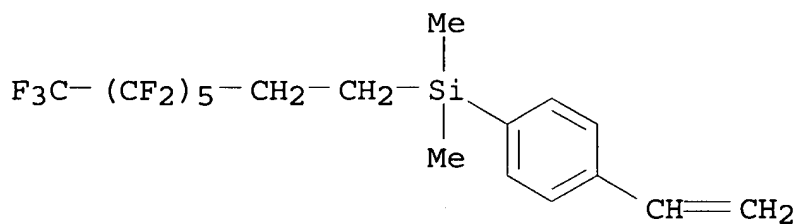
IT **121280-98-6P**  
 RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)  
 (manuf. and esterification of)

RN 121280-98-6 HCAPLUS

CN 2-Propenoic acid, 2-hydroxyethyl ester, polymer with (4-ethenylphenyl)dimethyl(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)silane (9CI) (CA INDEX NAME)

CM 1

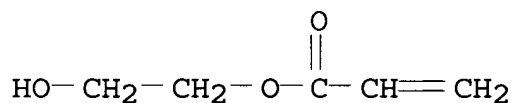
CRN 121247-91-4  
 CMF C18 H17 F13 Si



CM 2

CRN 818-61-1

CMF C5 H8 O3



IT 121293-70-7P

RL: PREP (Preparation)

(manuf. of photocrosslinkable, with low refractive index)

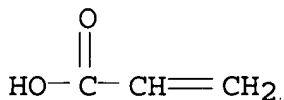
RN 121293-70-7 HCAPLUS

CN 2-Propenoic acid, 2-hydroxyethyl ester, polymer with  
 (4-ethenylphenyl)dimethyl(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)silane, 2-propenoate (9CI) (CA INDEX NAME)

CM 1

CRN 79-10-7

CMF C3 H4 O2



CM 2

CRN 121280-98-6

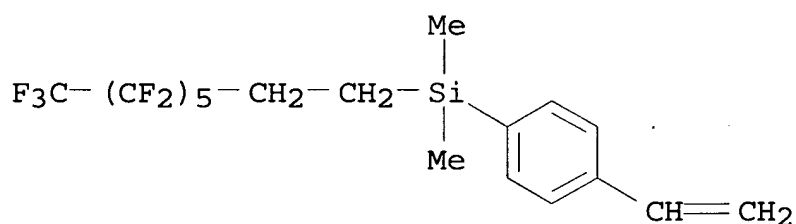
CMF (C18 H17 F13 Si . C5 H8 O3)x

CCI PMS

CM 3

CRN 121247-91-4

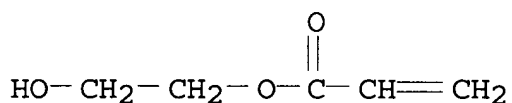
CMF C18 H17 F13 Si



CM 4

CRN 818-61-1

CMF C5 H8 O3



IT 121280-93-1DP, mercaptoethanol-terminated, acrylate

RL: PREP (Preparation)

(photocrosslinkable, with low refractive index, manuf. of)

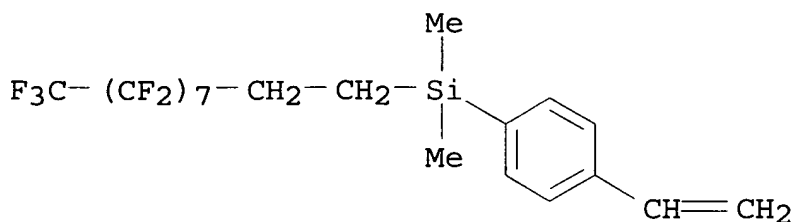
RN 121280-93-1 HCAPLUS

CN 2-Propenoic acid, 2-hydroxyethyl ester, polymer with  
 (4-ethenylphenyl) (3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-  
 heptadecafluorodecyl)dimethylsilane (9CI) (CA INDEX NAME)

CM 1

CRN 103298-73-3

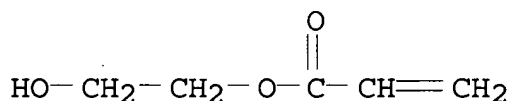
CMF C20 H17 F17 Si



CM 2

CRN 818-61-1

CMF C5 H8 O3



IC ICM C08F012-20

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)  
 Section cross-reference(s): 73

ST fluorine contg polystyrene **photoresist**; optical fiber  
 fluorine contg polystyrene

IT **Resists**

(photo-, neg.-working, fluorine-contg. polystyrene derivs. as, with low refractive index, manuf. of)

IT 121280-96-4P 121280-97-5P **121280-98-6P**

RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)  
 (manuf. and esterification of)

IT 121280-92-0P 121293-69-4P **121293-70-7P** 121293-71-8P

RL: PREP (Preparation)

(manuf. of photocrosslinkable, with low refractive index)

IT **121280-93-1DP**, mercaptoethanol-terminated, acrylate

121280-97-5DP, mercaptoethanol-terminated, acrylate

RL: PREP (Preparation)

(photocrosslinkable, with low refractive index, manuf. of)

L30 ANSWER 28 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN

1988:580442 Document No. 109:180442 Positive-working **resist**

from multicomponent crosslinking-copolymer comprising sulfur dioxide and vinyl compound. Matsuda, Minoru; Ono, Hiroshi (Chisso Corp., Japan). Jpn. Kokai Tokkyo Koho JP 63000319 A2 19880105 Showa, 8 pp.

(Japanese). CODEN: JKXXAF. APPLICATION: JP 1986-142312 19860618.

AB In the 1st invention, the title copolymer comprises 1-50 mol% SO<sub>2</sub> and 50-99 mol% vinyl compd. (trialkylsilylstyrene is excluded in case of a 2-component polymer; typically, chlorostyrene, chloromethylstyrene, acetoxystyrene, and hydroxystyrene), and the wt. av. mol. wt. thereof is 103-106. In the 2nd invention, the title copolymer (e.g., comprising 30-50 mol% SO<sub>2</sub> and 50-70 mol% vinyl compd. and having 5 + 104-106 wt. av. mol. wt.) has  $\geq 1$  monomer units (20-49 mol%) selected from (1) aliph. olefins and (2)  $\geq 1$  monomer units (1-30 mol%) selected from arom. vinyl compds. or Si-contg. vinyl compds. 1-Butene, 2-Me-1-butene, and 2-Me-1-pentene are included in (1), and styrene, chlorostyrene, acetoxystyrene, hydroxystyrene, and trimethylallylsilane are included in (2). This copolymer is dry-etching resistant, and is useful as a pos.-working **resist** decomposable with electron and x-ray beams at high sensitivity.

IT **117057-25-7P**  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (prepn. and use of, for pos.-working **resist** for electron and x-ray beams)

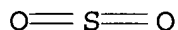
RN 117057-25-7 HCAPLUS

CN Silane, (4-ethenylphenyl)trimethyl-, polymer with 1-butene and sulfur dioxide (9CI) (CA INDEX NAME)

CM 1

CRN 7446-09-5

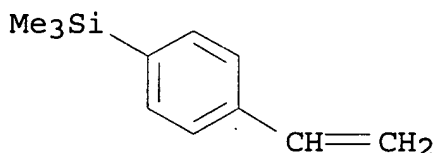
CMF 02 S



CM 2

CRN 1009-43-4

CMF C11 H16 Si

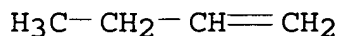




CM 3

CRN 106-98-9

CMF C4 H8



IC ICM C08G075-22

ICS G03C001-72

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

ST pos working **resist** copolymer; electron beam **resist** copolymer; x ray **resist** copolymer; sulfur dioxide vinyl compd copolymerIT **Resists**

(pos.-working, for electron and x-ray beams, from copolymer comprising sulfur dioxide and vinyl compd.)

IT 117057-20-2P 117057-21-3P 117057-22-4P 117057-24-6P

117057-25-7P 117137-58-3P

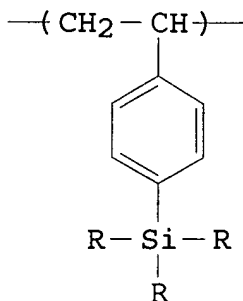
RL: SPN (Synthetic preparation); PREP (Preparation)

(prepn. and use of, for pos.-working **resist** for electron and x-ray beams)

L30 ANSWER 29 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN

1988:539176 Document No. 109:139176 Silicon-containing negative **photoresist** composition. Konishi, Shinji; Furuta, Akihiro; Hanabatake, Makoto; Onishi, Yoshitake; Watanabe, Fumitake (Sumitomo Chemical Co., Ltd., Japan; NEC Corp.). Jpn. Kokai Tokkyo Koho JP 63070846 A2 19880331 Showa, 4 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1986-216767 19860912.

GI



I

AB The title compn. contains I (R = lower alkyl) and a photosensitive bisdiazido compd. Thus, a Si substrate was sequentially spin-coated with AZ-1470 (1.2  $\mu\text{m}$  thick), and trimethylsilylstyrene polymer and 2,6-di-(4'-azidobenzylidene)-4-methylcyclohexanone (10:1 mixt.). The lower layer of AZ-1470 was etched by O<sub>2</sub> reactive ion etching using the upper layer as a **mask**. The upper layer had no change in its thickness with the etching and the lower layer had a vertical etching profile.

IT 79716-05-5

RL: USES (Uses)

(**photoresist** from)

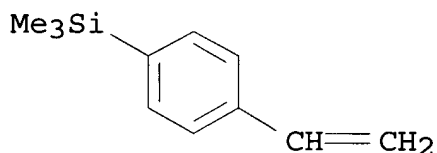
RN 79716-05-5 HCAPLUS

CN Silane, (4-ethenylphenyl)trimethyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 1009-43-4

CMF C11 H16 Si



IC ICM G03C001-71

ICS C08L025-18; G03F007-08

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

ST etching resistant trialkylsilylstyrene polymer **photoresist**; photosensitive bisdiazido compd **photoresist**; azidobenzylidene methylcyclohexanone photosensitive **photoresist**; trimethylsilylstyrene polymer **photoresist**

IT **Resists**

(photo-, contg. trialkylsilylstyrene polymer and photosensitive bisdiazido compd.)

IT 5284-79-7

RL: USES (Uses)

(**photoresist** contg. trialkylsilylstyrene polymer and)

IT 79716-05-5

RL: USES (Uses)

(**photoresist** from)

1988:464344 Document No. 109:64344 Negative-working  
**photoresist** containing acrylamide derivative polymers.  
 Goethe, Sven; Hult, Anders (Aktiebolag Wilh. Becker, Swed.). Eur.  
 Pat. Appl. EP 250377 A1 19871223, 10 pp. DESIGNATED STATES: R: AT,  
 BE, CH, DE, ES, FR, GB, IT, LI, LU, NL, SE. (English). CODEN:  
 EPXXDW. APPLICATION: EP 1987-850150 19870507. PRIORITY: SE  
 1986-2224 19860515.

AB A neg.-working **photoresist** which has a high sensitivity  
 (.apprx.10 mJ/cm<sup>2</sup>), is water- and/or alc.-developable, and provides  
**resist** images useful for semiconductor device manufg., such  
 as integrated or printed circuits comprises a polymeric compn.  
 consisting of a homopolymer, a copolymer, or a mixt. of polymers  
 where acrylamide, methacrylamide or one of their derivs. is a part  
 of ≥1 of the polymers and comprising chem. groups which can  
 self-or cocondense with other chem. groups under acid conditions,  
 ≥1 cationic photoinitiator which generates an acid catalyst,  
 such as a Lewis acid or a Bronsted acid, and other components, such  
 as solvents and sensitizers. The methacrylamide derivs. include  
 methylmethacrylamide glycolate Me ether, methylmethacrylamide  
 glycolate, and butylmethacrylamide glycolate. Triphenylsulfonium  
 hexafluoroantimonate may be used as a cationic photoinitiator.

IT 104452-14-4 115558-62-8 115558-63-9

RL: USES (Uses)

(neg.-working water- or alc.-developable **photoresists**  
 contg. cationic photoinitiator and, for semiconductor device  
 fabrication)

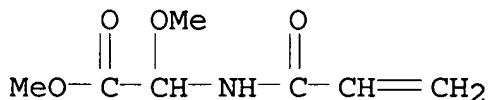
RN 104452-14-4 HCAPLUS

CN Acetic acid, methoxy[(1-oxo-2-propenyl)amino]-, methyl ester,  
 polymer with (4-ethenylphenyl)trimethylsilane (9CI) (CA INDEX NAME)

CM 1

CRN 77402-03-0

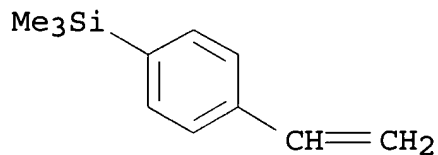
CMF C7 H11 N O4



CM 2

CRN 1009-43-4

CMF C11 H16 Si



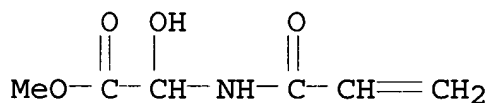
RN 115558-62-8 HCAPLUS

CN Acetic acid, hydroxy[(1-oxo-2-propenyl)amino]-, methyl ester,  
polymer with (4-ethenylphenyl)trimethylsilane (9CI) (CA INDEX NAME)

CM 1

CRN 77402-05-2

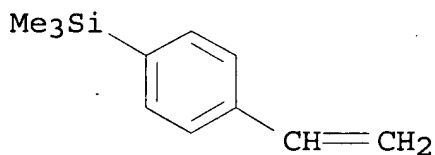
CMF C6 H9 N O4



CM 2

CRN 1009-43-4

CMF C11 H16 Si



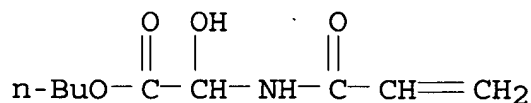
RN 115558-63-9 HCAPLUS

CN Acetic acid, hydroxy[(1-oxo-2-propenyl)amino]-, butyl ester, polymer  
with (4-ethenylphenyl)trimethylsilane (9CI) (CA INDEX NAME)

CM 1

CRN 89995-71-1

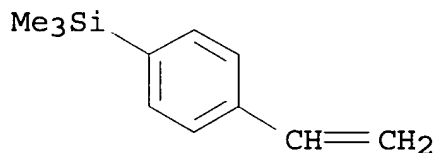
CMF C9 H15 N O4



CM 2

CRN 1009-43-4

CMF C11 H16 Si



- IC ICM G03C001-70
- CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)  
Section cross-reference(s): 76
- ST neg **photoresist** acrylamide deriv polymer; methacrylamide deriv polymer neg **photoresist**; integrated circuit **photoresist** acrylamide polymer
- IT Semiconductor devices  
(neg.-working water- or alc.-developable **photoresists** contg. acrylamide polymers for fabrication of)
- IT Electric circuits  
(integrated, neg.-working water- or alc.-developable **photoresists** contg. acrylamide polymers for fabrication of)
- IT **Resists**  
(photo-, neg.-working, water- or alc.-developable, contg. acrylamide deriv. polymers)
- IT 57840-38-7, Triphenylsulfoniumhexafluoroantimonate  
RL: USES (Uses)  
(neg.-working water- or alc.-developable **photoresists** contg. acrylamide deriv. polymers and, for fabrication of semiconductor devices)
- IT 104452-10-0 104452-13-3 104452-14-4 115558-62-8 115558-63-9  
RL: USES (Uses)  
(neg.-working water- or alc.-developable **photoresists** contg. cationic photoinitiator and, for semiconductor device fabrication)

L30 ANSWER 31 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN

1988:438845 Document No. 109:38845 Manufacture of copolymers of sulfur dioxide, acetylenes, and vinyl compounds. Matsuda, Minoru (Chisso Corp., Japan; Denki Kagaku Kogyo K. K.). Jpn. Kokai Tokkyo Koho JP 63010634 A2 19880118 Showa, 8 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1986-144436 19860620.

AB Linear title copolymers having no. av. mol. wt. (Mn)  $\geq 500$ , and good soly. in common org. solvents and dry etching resistance, useful for **photoresists**, comprise 30-50 mol% SO<sub>2</sub> units, and 50-70 mol% units derived from acetylenes and vinyl compds. Thus, 10.8 g CH<sub>2</sub>CH=CHCH<sub>2</sub>CH<sub>3</sub>(I), 11.2 g CH<sub>2</sub>:CHCH<sub>2</sub>CH<sub>3</sub> and 8.8 mL dry liq. SO<sub>2</sub> were mixed in a o-dichlorobenzene in the presence of AIBN at 50° for 16 h to give a polymer (II) with Mn 69,000, which was sol. in MEK, acetone, CHCl<sub>3</sub>, THF, dioxane and Me Cellosolve acetate (III), vs. insol. for polymer similarly prepd. in the absence of I. Coating silicon wafer with a III soln. of II and baking at 120° for 1 h gave a 0.45- $\mu$  **resist** layer, which, after irradiating with electron beam, developing and post-baking, showed radiation sensitivity  $3 \times 10^{-5}$  C/cm<sup>2</sup>.

IT 115299-34-8P

RL: PREP (Preparation)

(manuf. of, for **photoresists** with good soly.)

RN 115299-34-8 HCAPLUS

CN Silane, (4-ethenylphenyl)trimethyl-, polymer with 1-butene, 1-hexyne and sulfur dioxide (9CI) (CA INDEX NAME)

CM 1

CRN 7446-09-5

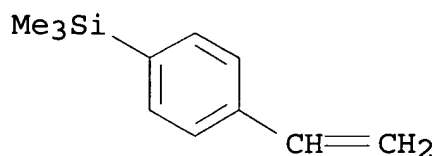
CMF 02 S

O=S=O

CM 2

CRN 1009-43-4

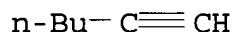
CMF C11 H16 Si



CM 3

CRN 693-02-7

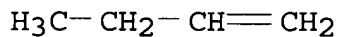
CMF C6 H10



CM 4

CRN 106-98-9

CMF C4 H8



IC ICM C08G075-22

ICS G03C001-72

CC 37-3 (Plastics Manufacture and Processing)

Section cross-reference(s): 74

ST acetylene polysulfone manuf; butyne polysulfone manuf; butene polysulfone manuf; soly polysulfone; **photoresist** polysulfone

IT Polysulfones, preparation

RL: PREP (Preparation)

(contg. acetylenes and vinyl compds., manuf. of, for **photoresists** with good soly.)IT **Resists**

(photo-, pos.-working, polysulfones contg. acetylene derivs. and vinyl compds. for, with good soly.)

IT 115299-32-6P, 1-Butene-1-butyne-sulfur dioxide copolymer

115299-33-7P **115299-34-8P**

RL: PREP (Preparation)

(manuf. of, for **photoresists** with good soly.)

1988:168165 Document No. 108:168165 Manufacture of alkenylsilyl group-containing polymers for **resists**. Fujimoto, Teruo; Shiono, Mikio; Watanabe, Osamu; Ito, Koichi (Shin-Etsu Chemical Industry Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 62215608 A2 19870922 Showa, 5 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1986-57960 19860314.

AB Title polymers are manufd. by polymn. of vinyl monomers contg.  $p\text{-CH}_2\text{:CRC}_6\text{H}_4\text{SiR}_1\text{R}_2(\text{CH}_2)_n\text{CH:CH}_2$  (I; R = H, Me, Et; R<sub>1</sub>, R<sub>2</sub> = C<sub>1</sub>-3 alkyl, Ph; n = 0-4) in the presence of org. metal compds. (initiators) and tertiary amines. Thus, 11.5 mL I (R = H, R<sub>1</sub> = R<sub>2</sub> = Me, n = 0) was polymd. in THF in the presence of  $1.08 + 10^{-4}$  mol cumyl cesium and  $6.45 + 10^{-4}$  mol N-methylpyrrolidine at -78° for 15 min to give 10.3 g white polymer (no.-av. mol. wt.  $9.4 + 10^4$ ) with very narrow mol. wt. distribution.

IT **98539-45-8P**  
RL: IMF (Industrial manufacture); PREP (Preparation)  
(manuf. of, in the presence of tertiary amines and orangometals, for narrow mol. wt. distribution)

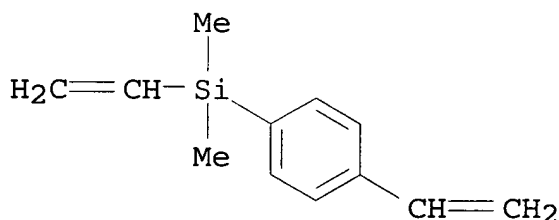
RN 98539-45-8 HCAPLUS

CN Silane, ethenyl(4-ethenylphenyl)dimethyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 18053-60-6

CMF C12 H16 Si



IC ICM C08F012-14

CC 35-4 (Chemistry of Synthetic High Polymers)  
Section cross-reference(s): 74

IT **Resists**  
(neg.-working, alkenylsilyl group-contg. polymers for, manuf. of)

IT **98539-45-8P**  
RL: IMF (Industrial manufacture); PREP (Preparation)  
(manuf. of, in the presence of tertiary amines and orangometals, for narrow mol. wt. distribution)



1988:104057 Document No. 108:104057 Manufacture of copolymers of sulfur dioxide and trialkylsilylstyrenes. Matsuda, Minoru; Ono, Hiroshi (Chisso Corp., Japan). Jpn. Kokai Tokkyo Koho JP 62215628 A2 19870922 Showa, 10 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1986-51638 19860310.

AB The linear title copolymers having a no. av. mol. wt. (.hivin.M.hivin.n) 500-500,000, and comprising 1-50 mol% SO<sub>2</sub> units, and 50-99 mol% CH<sub>2</sub>CH(C<sub>6</sub>H<sub>4</sub>SiRR<sub>1</sub>R<sub>2</sub>) (R, R<sub>1</sub>, R<sub>2</sub> = lower alkyl), useful as **resists** with good plasma resistance, are prepd. by polymg. SO<sub>2</sub> and trialkylsilylstyrenes at -100-100°. Thus 44.1 mL p-trimethylsilylstyrene, 6.6 mL dried SO<sub>2</sub>, and 84 mg AIBN were mixed at 35° for 24 h to give 5.0 g polymer with .hivin.M.hivin.n 187,000. Coating a 6.3% Me Cellosolve acetate soln. of the polymer onto a wafer, and baking at 120° for 1 h gave a 0.48-μ **resist** coating with etching speed 220 Å/min vs. 290 Å/min for a com. novolak resin. Irradiating the coating with an electron beam, developing with a 1:5 dioxane/iso-PrOH mixt., rinsing with iso-PrOH, and post-baking gave an image-contg. wafer with an exposure sensitivity (measured as sensitivity at the area where coating had been removed) of 3 + 10-5 C/cm<sup>2</sup>.

IT 113032-02-3P

RL: PREP (Preparation)

(manuf. of, for **resists** with good plasma resistance)

RN 113032-02-3 HCAPLUS

CN Silane, (4-ethenylphenyl)trimethyl-, polymer with sulfur dioxide (9CI) (CA INDEX NAME)

CM 1

CRN 7446-09-5

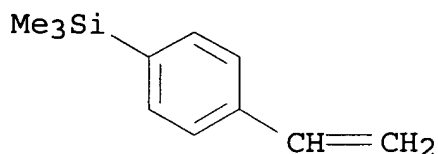
CMF 02 S

O=S=O

CM 2

CRN 1009-43-4

CMF C11 H16 Si



- IC ICM C08G075-20  
ICS G03C001-72
- CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)  
Section cross-reference(s): 37, 42
- ST **resist** coating polysulfone polystyrene deriv; plasma resistant **resist** alkylsilylstyrene polymer; sulfur dioxide polymer **resist** coating; styrene alkylsilyl polymer **resist** coating
- IT Polysulfones, preparation  
RL: PREP (Preparation).  
(alkylsilylstyrene group-contg., manuf. of, for **resists** with good plasma resistance)
- IT **Resists**  
(electron-beam, poly(alkylsilylstyrene sulfones) as plasma-resistant, manuf. of)
- IT **Resists**  
(gamma-ray, poly(alkylsilylstyrene sulfones) as plasma-resistant, manuf. of)
- IT **113032-02-3P**  
RL: PREP (Preparation)  
(manuf. of, for **resists** with good plasma resistance)
- L30 ANSWER 34 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN  
1988:29305 Document No. 108:29305 A new high-sensitivity, water-developable negative **photoresist**. Hult, Anders; Skolling, Otto; Goethe, Sven; Mellstroem, Ulla (Dep. Polym. Technol., R. Inst. Technol., Stockholm, S-100 44, Swed.). ACS Symposium Series, 346(Polym. High Technol.: Electron. Photonics), 162-9 (English) 1987. CODEN: ACSMC8. ISSN: 0097-6156.
- AB Polymers based on methylacrylamidoglycolate Me ether (MAGME) were synthesized and used as neg. tone **photoresists**. MAGME-contg. polymers can undergo acid-catalyzed crosslinking by a self-condensation reaction. p-Toluenesulfonic acid, a UV-deblockable sulfonic acid, and a triphenylsulfonium salt were used as catalysts. Acid-catalyzed crosslinking is another example of chem. amplification in **photoresist** systems. These MAGMe-polymers exhibit high sensitivity but a limited line-width resoln. They are sol. in harmless solvents like water and alcs.
- IT **104452-14-4**

RL: USES (Uses)

(crosslinking via self-condensation of high sensitivity  
water-developable neg. **photoresist** from)

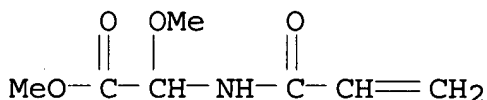
RN 104452-14-4 HCAPLUS

CN Acetic acid, methoxy[(1-oxo-2-propenyl)amino]-, methyl ester,  
polymer with (4-ethenylphenyl)trimethylsilane (9CI) (CA INDEX NAME)

CM 1

CRN 77402-03-0

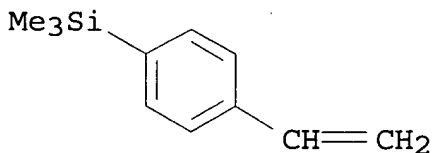
CMF C7 H11 N O4



CM 2

CRN 1009-43-4

CMF C11 H16 Si



CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and  
Other Reprographic Processes)

ST neg **photoresist** water developable;  
methylacrylamidoglycolate methyl ether copolymer **photoresist**

IT **Resists**

(photo-, neg., high sensitivity water developable polymers based  
on methacrylamidoglycolate Me ether)

IT 104452-10-0 104452-11-1 104452-12-2 104452-13-3

**104452-14-4** 104452-15-5

RL: USES (Uses)

(crosslinking via self-condensation of high sensitivity  
water-developable neg. **photoresist** from)

IT 104-15-4, p-Toluenesulfonic acid, uses and miscellaneous 1678-43-9  
57840-38-7

RL: USES (Uses)

(high sensitivity water developable neg. **photoresist**

compn. contg. polymers based on methylacrylamidoglycolate Me ether and)

IT 67-56-1, Methanol, properties 67-64-1, Acetone, properties  
67-66-3, Chloroform, properties 108-88-3, Toluene, properties  
141-78-6, Ethyl acetate, properties 142-82-5, Heptane, properties  
RL: PRP (Properties)  
(soly. of polymers based on methylacrylamidoglycolate Me ether in  
soln. of, as neg. **photoresist**)

L30 ANSWER 35 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN  
1987:587475 Document No. 107:187475 **Resist** composition and  
fine pattern formation method. Watanabe, Fumitake (NEC Corp.,  
Japan). Jpn. Kokai Tokkyo Koho JP 62135822 A2 19870618 Showa, 4 pp.  
(Japanese). CODEN: JKXXAF. APPLICATION: JP 1985-277236 19851209.

AB Fine patterns are formed by coating an org. polymer on a substrate,  
overcoating with a **resist** compn. based on  
[CH<sub>2</sub>CH(p-C<sub>6</sub>H<sub>4</sub>SiR<sub>1</sub>R<sub>2</sub>CH<sub>2</sub>SiR<sub>3</sub>R<sub>4</sub>R<sub>5</sub>)]<sub>m</sub>[CH<sub>2</sub>CH(C<sub>6</sub>H<sub>6</sub>H<sub>4</sub>CH<sub>2</sub>Cl)]<sub>n</sub> (I; R<sub>1</sub>-R<sub>5</sub> =  
lower alkyl, H; m, n = integer) forming patterns by a **lithog**  
. technique, and dry etching the polymer layer by using the formed  
patterns as a **mask**. The **resist** compn. has  
enough dry etching resistance to print the patterns precisely on an  
org. polymer layer, allowing the fabrication of semiconductor  
integrated circuits, etc. Thus, novolak resin was coated on a Si  
substrate, overcoated with I (R<sub>1</sub>-R<sub>5</sub> = Me; wt. av. mol. wt.  
.apprx.83,000), irradiated with an electron beam, and ion-etched to  
give precise patterns.

IT **110885-85-3**  
RL: USES (Uses)  
(**resist** from, dry-etching resistant, for fine pattern  
formation in org. polymer layer)

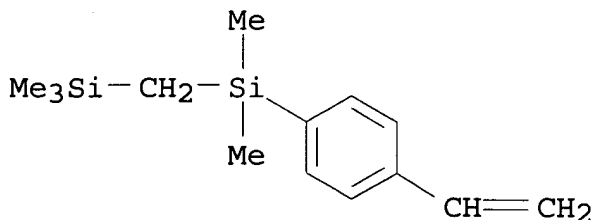
RN 110885-85-3 HCAPLUS

CN Silane, [[(4-ethenylphenyl)dimethylsilyl]methyl]trimethyl-, polymer  
with (chloromethyl)ethenylbenzene (9CI) (CA INDEX NAME)

CM 1

CRN 98795-16-5

CMF C14 H24 Si2

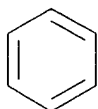


CM 2

CRN 30030-25-2

CMF C9 H9 Cl

CCI IDS



D1-CH<sub>2</sub>-Cl

D1-CH=CH<sub>2</sub>

IC ICM G03C001-71

ICS C08F212-14; G03C001-00; G03F007-10; H01L021-30

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

ST styrene silylated polymer **resist** neg; dry etching  
resistance **resist** bilayer

IT Electric circuits

(integrated, silyl-contg. polystyrene bilayer **resist**  
for fabrication of)

IT **Resists**

(neg.-working, bilayer, silyl-contg. polystyrene for dry  
etching-resistant, for fine pattern formation in org. polymer  
layer)

IT **110885-85-3**

RL: USES (Uses)

(**resist** from, dry-etching resistant, for fine pattern  
formation in org. polymer layer)

L30 ANSWER 36 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN

1986:562267 Document No. 105:162267 **Resist** compositions.

Fujimoto, Teruo; Kazama, Takeo; Takamizawa, Minoru; Yamamoto, Akira  
(Shin-Etsu Chemical Industry Co., Ltd., Japan). Jpn. Kokai Tokkyo  
Koho JP 61027537 A2 19860207 Showa, 4 pp. (Japanese). CODEN:  
JKXXAF. APPLICATION: JP 1984-148778 19840718.

AB The **resist** compns. contain, as a main constituent, a  
polymer having substituted vinylsilyl groups, which is prepd. by

selectively polymg. the styrenic double bond of a styrene compd. of the formula  $\text{CH}_2\text{:CHC}_6\text{H}_4\text{SiMe}_2\text{CR:CR}_1\text{R}_2$  ( $\text{R}, \text{R}_1, \text{R}_2 = \text{H}, \text{Me}, \text{Et}$ ;  $\text{R} = \text{R}_1 = \text{R}_2 \neq \text{H}$ ). The **resist** compns. provide high-quality neg.-working **resists** with high resoln. and good dry-etching resistance. Thus, a mixt. of 1-methylvinyl dimethylchlorosilane and 2-methylvinyl dimethylchlorosilane was reacted with p-chlorostyrene by using the Grignard reaction, the resulting mixt. of p-vinylphenyl dimethyl(1-methylvinyl)silane and p-vinylphenyl dimethyl(2-methylvinyl)silane was purified, and then copolymd. in the presence of cumyl Cs by means of living anionic polymn. to give a copolymer having substituted vinylsilyl groups. The copolymer was dissolved in xylene, 2,6-bis(4-azidobenzylidene)cyclohexanone added, and the compn. coated on a Si wafer to obtain a **resist** coating, which gave high resoln. **resist** patterns and showed good resistance to dry etching.

IT 104609-52-1 104609-54-3 104609-56-5

104609-58-7

RL: USES (Uses)

(neg.-working **photoresist** compns. contg., for high-resoln. images with good dry-etching resistance)

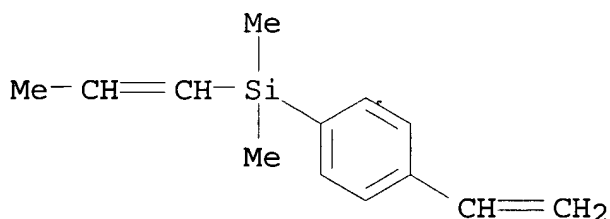
RN 104609-52-1 HCAPLUS

CN Silane, (4-ethenylphenyl)dimethyl(1-methylethenyl)-, polymer with (4-ethenylphenyl)dimethyl-1-propenylsilane (9CI) (CA INDEX NAME)

CM 1

CRN 104583-61-1

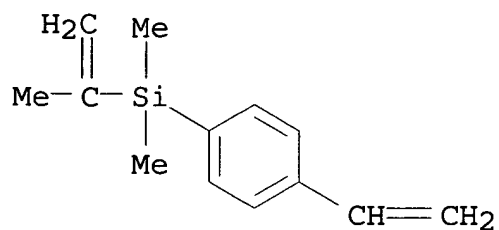
CMF C13 H18 Si



CM 2

CRN 104583-60-0

CMF C13 H18 Si



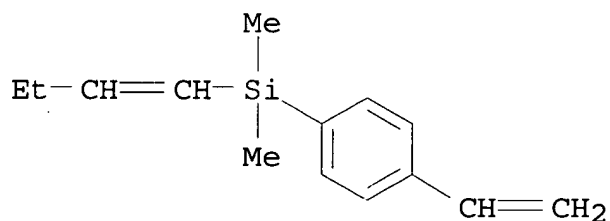
RN 104609-54-3 HCAPLUS

CN Silane, 1-butenyl(4-ethenylphenyl)dimethyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 104609-53-2

CMF C14 H20 Si



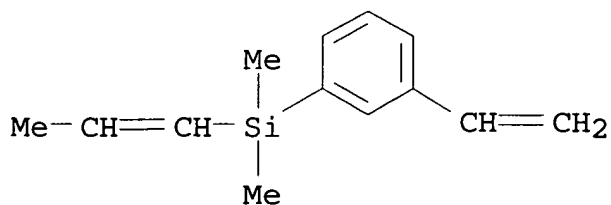
RN 104609-56-5 HCAPLUS

CN Silane, (3-ethenylphenyl)dimethyl-1-propenyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 104609-55-4

CMF C13 H18 Si



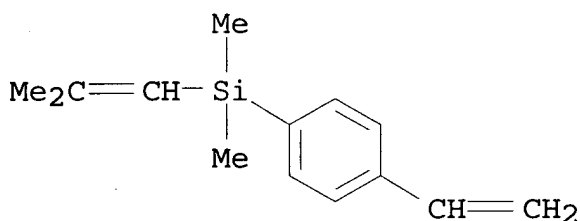
RN 104609-58-7 HCAPLUS

CN Silane, (4-ethenylphenyl)dimethyl(2-methyl-1-propenyl)-, homopolymer  
(9CI) (CA INDEX NAME)

CM 1

CRN 104609-57-6

CMF C14 H20 Si



IC ICM G03C001-71

ICS C08F030-08; G03F007-10

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and  
Other Reprographic Processes)

ST vinylsilyl group polymer **photoresist**;  
vinylphenylvinylsilyl polymer **photoresist** dry etching

IT **Resists**

(electron-beam, neg.-working, contg. (vinylphenyl)vinylsilane  
deriv. polymers for high-resoln. images with good dry-etching  
resistance)

IT **Resists**

(photo-, neg.-working, contg. (vinylphenyl)vinylsilane deriv.  
polymers for high-resoln. images with good dry-etching  
resistance)

IT 20237-98-3

RL: USES (Uses)

(neg.-working **photoresist** compns. contg.  
vinylphenyl)vinylsilane deriv. polymer and, for high-resoln.  
images with good dry-etching resistance)

IT 104609-52-1 104609-54-3 104609-56-5

104609-58-7

RL: USES (Uses)

(neg.-working **photoresist** compns. contg., for  
high-resoln. images with good dry-etching resistance)

L30 ANSWER 37 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN

1986:543403 Document No. 105:143403 Oxygen ion-etching resistance of  
organosilicon polymers. Gokan, H.; Saotome, Y.; Saigo, K.;  
Watanabe, F.; Ohnishi, Y. (Microelectron. Res. Lab., Kawasaki, 213,  
Japan). Polymeric Materials Science and Engineering, 55, 725-9



(English) 1986. CODEN: PMSEDG. ISSN: 0743-0515.

AB The etching resistance was examd. for various organosilicon polymers under O2-IBE (ion beam etching) and O2-RIE conditions. Under O2-IBE, ion bombardment and ion-assisted chem. reaction predominated and the etching due to radical species was negligibly small. Under O2-RIE, the effect of ion bombardment and the radical species could not be sepd. The rate detg. step under ion bombardment is the sputtering of Si atoms in the polymers. Polymer flow and/or surface temp. rise enhances SiO2 film formation under O2-RIE, as long as the polymers are thermally stable.

IT 101364-78-7

RL: PRP (Properties)

(oxygen ion-etching resistance of)

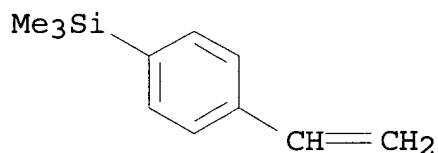
RN 101364-78-7 HCAPLUS

CN Silane, (4-ethenylphenyl)trimethyl-, polymer with ethenylbenzene (9CI) (CA INDEX NAME)

CM 1

CRN 1009-43-4

CMF C11 H16 Si



CM 2

CRN 100-42-5

CMF C8 H8



CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)  
Section cross-reference(s): 36

ST organosilicon polymer ion etching **resist**

IT **Resists**

(organosilicon polymer, oxygen ion-etching resistance in relation to)

IT 24969-11-7D, trimethylsilylmethylated 77884-20-9

101364-78-7 102814-53-9

RL: PRP (Properties)

(oxygen ion-etching resistance of)

L30 ANSWER 38 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN

1986:543401 Document No. 105:143401 A new high sensitivity, water developable negative **photoresist**. Hult, Anders; Skolling, Otto; Goethe, Sven; Mellstroem, Ulla (Dep. Polym. Technol., R. Inst. Technol., Stockholm, S-100 44, Swed.). Polymeric Materials Science and Engineering, 55, 594-8 (English) 1986. CODEN: PMSEDG. ISSN: 0743-0515.

AB The development is considered of new generation **resist** materials which possess improved sensitivity and enhanced resoln. obtained by chem. amplification, namely acid catalyst self-condensation of acrylic polymers. These materials, based on Me acrylamidoglycolate Me ether, generate neg. tone images and consist of a water (or alc.) sol. polymer which can undergo acid catalyst crosslinking.

IT 104452-14-4P

RL: PREP (Preparation)

(prepn. and self-condensation and developable properties of **photoresist** of)

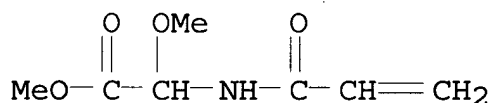
RN 104452-14-4 HCAPLUS

CN Acetic acid, methoxy[(1-oxo-2-propenyl)amino]-, methyl ester, polymer with (4-ethenylphenyl)trimethylsilane (9CI) (CA INDEX NAME)

CM 1

CRN 77402-03-0

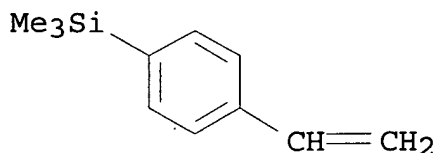
CMF C7 H11 N O4



CM 2

CRN 1009-43-4

CMF C11 H16 Si



CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

ST neg **photoresist** acrylamidoglycolate methyl ether

IT **Resists**

(photo-, neg., high-sensitivity water-developable, based on Me acrylamidoglycolate Me ether)

IT 104452-10-0P 104452-11-1P 104452-12-2P 104452-13-3P

**104452-14-4P** 104452-15-5P

RL: PREP (Preparation)

(prepn. and self-condensation and developable properties of **photoresist** of)

L30 ANSWER 39 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN

1986:177746 Document No. 104:177746 Polymers containing silicon and allyl groups, compositions containing the said polymer, and their uses. Saigo, Kazuhide; Suzuki, Shigeyoshi (NEC Corp., Japan). Jpn. Kokai Tokkyo Koho JP 60203609 A2 19851015 Showa, 11 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1984-59803 19840328.

AB Polymers contg. allylsilyl groups, photosensitive compns. contg. the polymers and bisazide compds., and their uses as org. film dry etching **mask-forming resists** are claimed. Thus, triallylsilane was polymd. by using benzoyl peroxide as a polymn. initiator. The triallylsilane polymer was used as an electron-beam **resist** to form fine patterns having excellent plasma etching resistance. Addn. of 2,6-bis(4-azidobenzylidene)cyclohexanone improved significantly the sensitivity of the **resist**.

IT **101702-70-9P**

RL: PREP (Preparation)

(prepn. of, for use as electron-beam **resist**)

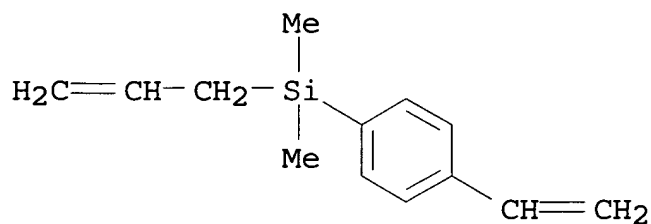
RN 101702-70-9 HCAPLUS

CN Silane, (4-ethenylphenyl)dimethyl-2-propenyl-, polymer with ethenylbenzene (9CI) (CA INDEX NAME)

CM 1

CRN 18052-72-7

CMF C13 H18 Si



CM 2

CRN 100-42-5

CMF C8 H8

 $\text{H}_2\text{C}=\text{CH}-\text{Ph}$ 

IC ICM C08F030-08

ICS G03C001-71; G03F007-10

ICA H01L021-30

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

Section cross-reference(s): 35, 76

ST allylsilane polymer electron beam **resist**; diazide sensitizer electron beam **resist**IT **Resists**

(electron-beam, allylsilane deriv. polymers as)

IT 20237-98-3

RL: USES (Uses)

(electron-beam **resist** contg. allylsilane deriv. polymers and)

IT 95797-43-6P 96439-43-9P 96439-44-0P 101702-67-4P

101702-69-6P **101702-70-9P**

RL: PREP (Preparation)

(prepn. of, for use as electron-beam **resist**)

L30 ANSWER 40 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN

1986:89221 Document No. 104:89221 Organic polymers with a monodispersing vinylsilyl group. (Shin-Etsu Chemical Industry Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 60090205 A2 19850521 Showa, 6 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1983-198928 19831024.

AB Org. polymers with monodispersing vinylsilyl groups were prepd. by living anionic polymn. of  $\text{CH}_2:\text{CHC}_6\text{H}_4(\text{CH}_2)_n\text{SiRR}_1\text{CH}:\text{CH}_2$  (R, R1 = alkyl, Ph, n = 0-3). The products had good characteristics as

neg.-type **resists**. Thus, Grignard reaction of EtBr, 4-ClC<sub>6</sub>H<sub>4</sub>CH:CH<sub>2</sub>, vinyltrimethylchlorosilane, and Mg in THF gave 4-CH<sub>2</sub>:CHC<sub>6</sub>H<sub>4</sub>SiMe<sub>2</sub>CH:CH<sub>2</sub>, which was polymd. in 2-methyltetrahydrofuran for 2 h at -78° in the presence of 1.2 + 10<sup>-4</sup> mol cumylcesium to give 100 % title compn.

IT 98539-45-8P 100328-21-0P

RL: PREP (Preparation)

(prepn. of, by anionic polymn.)

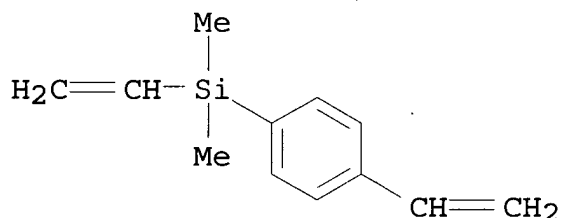
RN 98539-45-8 HCAPLUS

CN Silane, ethenyl(4-ethenylphenyl)dimethyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 18053-60-6

CMF C12 H16 Si



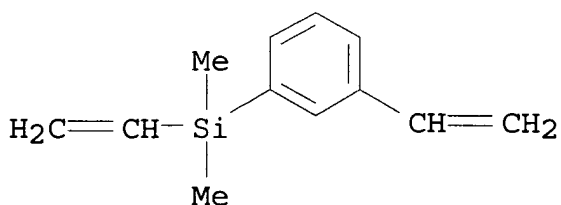
RN 100328-21-0 HCAPLUS

CN Silane, ethenyl(3-ethenylphenyl)dimethyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 100328-20-9

CMF C12 H16 Si



IC ICM C08F030-08

ICS G03C001-71; G03C005-08; G03F007-10

ICA C08F299-08

CC 35-4 (Chemistry of Synthetic High Polymers)  
Section cross-reference(s): 76

IT 98539-45-8P 100328-21-0P 100328-23-2P  
100328-25-4P 100328-27-6P  
RL: PREP (Preparation)  
(prepn. of, by anionic polymn.)

L30 ANSWER 41 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN  
1985:479344 Document No. 103:79344 Oxygen ion-beam etch resistance of  
metal-free and organosilicon **resist** materials. Gokan,  
Hiroshi; Ohnishi, Yoshitake; Saigo, Kazuhide (Microelectron. Res.  
Lab., NEC Corp., Kawasaki, 213, Japan). Microelectronic  
Engineering, Volume Date 1983, 1(4), 251-62 (English) 1985. CODEN:  
MIENEF. ISSN: 0167-9317.

AB O ion-beam etch resistance of metal-free and organosilicon  
**resist** materials was studied, using an etching system with a  
Kaufman ion gun. The etch rate for metal-free **resist**  
materials is inversely proportional to the no. of effective C atoms  
in a material. The effective term means subtracting the no. of O  
atoms from that of C atoms. This result suggests that the etch  
rate-detg. step is the sputtering of C atoms which are not bonded to  
O atoms. C atoms bonded to O atoms, for example :C:O or  
.tplbond.C-O-, may spontaneously desorb to form a volatile product  
CO under ion bombardment. The etch-rate ratio of an organosilicon  
**resist** material P(SiStCMS) to AZ1350J markedly increases  
with decreasing acceleration energy. This is because the rate-detg.  
step for an organosilicon **resist** material is mainly due to  
the sputtering of Si atoms in the polymer. This is supported by the  
fact that the etch rate of an organosilicon **resist**  
material increases with increasing beam angle, while that of  
metal-free **resist** material monotonically decreases with  
increasing beam angle.

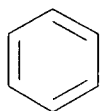
IT 87432-12-0  
RL: USES (Uses)  
(**resist** patterns, oxygen ion etching resistance of)

RN 87432-12-0 HCAPLUS

CN Silane, (4-ethenylphenyl)trimethyl-, polymer with  
(chloromethyl)ethenylbenzene (9CI) (CA INDEX NAME)

CM 1

CRN 30030-25-2  
CMF C9 H9 Cl  
CCI IDS



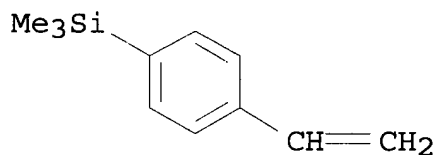
D1-CH<sub>2</sub>-Cl

D1-CH=CH<sub>2</sub>

CM 2

CRN 1009-43-4

CMF C11 H16 Si



- CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
- ST oxygen ion etching resistance **resist**; polymer **resist** oxygen ion etching; organosilicon **resist** oxygen ion etching
- IT Etching  
(of organosilicon and metal-free resin **resist** patterns by oxygen ions, resistance of)
- IT **Resists**  
(radiation, organosilicon and metal-free resin, oxygen ion etching resistance of developed)
- IT Siloxanes and Silicones, uses and miscellaneous  
RL: USES (Uses)  
(organo, **resist** patterns, oxygen ion etching resistance of)
- IT **Resists**  
(photo-, organosilicon and metal-free resin, oxygen ion etching resistance of developed)
- IT 7782-44-7D, ions, uses and miscellaneous  
RL: USES (Uses)

(etching of organosilicon and metal-free resin **resist** patterns by, resistance of)

IT 60267-30-3 87432-12-0

RL: USES (Uses)

(**resist** patterns, oxygen ion etching resistance of)

L30 ANSWER 42 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN

1984:415040 Document No. 101:15040 Microelectronic device. Suzuki, Masayoshi; Saigo, Kazuhide (NEC Corp., Japan). Eur. Pat. Appl. EP 96596 A1 19831221, 59 pp. DESIGNATED STATES: R: BE, DE, FR, GB, NL. (English). CODEN: EPXXDW. APPLICATION: EP 1983-303324 19830608. PRIORITY: JP 1982-98089 19820608; JP 1982-98090 19820608; JP 1982-123865 19820716; JP 1982-123866 19820716; JP 1982-194286 19821105.

AB A method of forming fine patterns in the manuf. of microelectronic devices by using optical or electron-beam **lithog.** and a dry etching technique, such as reactive sputter etching with O<sub>2</sub>, involves coating the substrate surface with a relatively thick org. layer and then forming a thin **resist** film from a polymer or copolymer comprising a trialkylsilyl group, dimethylphenylsilyl group, or trialkoxysilyl group thereon. The thickness of the **resist** film is so adjusted as to contain a sufficient no. of these groups/unit area of the **resist** pattern so as to ensure high endurance of the **resist** to dry etching for etching the thick org. layer. Thus, a soln. of a diallyl phthalate-trimethylallylsilane copolymer (70:30) 2.0 g in Me cellosolve acetate 20 mL was coated on a novolak resin-coated Si support, dried, electron-beam patternwise exposed, and developed. With the patterned copolymer film as a **mask**, the novolak resin film was subjected to reactive sputter etching. The copolymer film was sufficient to provide a mark for etching 1.5 µm of the novolak resin.

IT 79716-05-5 87432-12-0 87432-13-1

90570-72-2

RL: USES (Uses)

(electron-beam **resists**, dry etch-resistant, in fabrication of microelectronic devices)

RN 79716-05-5 HCAPLUS

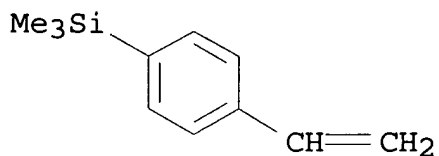
CN Silane, (4-ethenylphenyl)trimethyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 1009-43-4

CMF C11 H16 Si





RN 87432-12-0 HCAPLUS

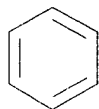
CN Silane, (4-ethenylphenyl)trimethyl-, polymer with  
(chloromethyl)ethenylbenzene (9CI) (CA INDEX NAME)

CM 1

CRN 30030-25-2

CMF C9 H9 Cl

CCI IDS



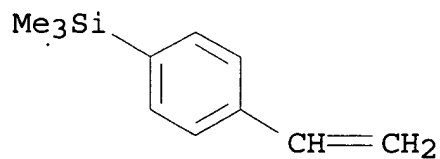
D1-CH<sub>2</sub>-Cl

D1-CH=CH<sub>2</sub>

CM 2

CRN 1009-43-4

CMF C11 H16 Si



RN 87432-13-1 HCAPLUS

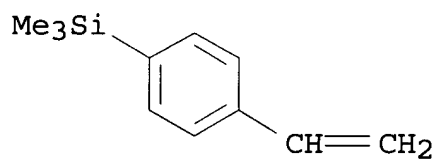
CN 2-Propenoic acid, 2-methyl-, oxiranylmethyl ester, polymer with

(4-ethenylphenyl)trimethylsilane (9CI) (CA INDEX NAME)

CM 1

CRN 1009-43-4

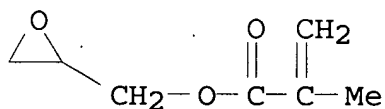
CMF C11 H16 Si



CM 2

CRN 106-91-2

CMF C7 H10 O3



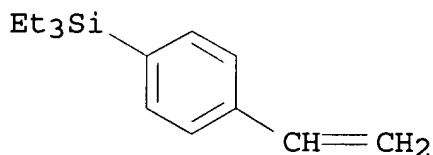
RN 90570-72-2 HCAPLUS

CN Silane, (4-ethenylphenyl)triethyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 1015-16-3

CMF C14 H22 Si



IC H01L021-312

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)  
Section cross-reference(s): 76

ST **photoresist** silyl group etch resistance  
IT **Resists**  
(electron-beam, silyl group-contg. polymers as, dry etching in relation to)  
IT Sputtering  
(etching, of silyl group-contg. **photoresists**, microelectronic device fabrication in relation to)  
IT Electric circuits  
(integrated, large-scale, dry etch-resistant silyl group-contg. **photoresists** in fabrication of)  
IT Memory devices  
(magnetic bubble, dry etch-resistant silyl group-contg. **photoresists** in fabrication of)  
IT Electronics  
(micro-, devices for, dry-etch-resistant silyl group-contg. **photoresists** in fabrication of)  
IT Etching  
(sputter, of silyl group-contg. **photoresists**, microelectronic device fabrication in relation to)  
IT 999-97-3D, reaction products with formaldehyde-phenol resins  
9003-35-4D, trimethylsilylated 17922-14-4D, polymers with olefins  
29158-71-2 30327-35-6 56486-71-6 **79716-05-5**  
**87432-12-0 87432-13-1** 90570-70-0 90570-71-1  
**90570-72-2** 90570-73-3  
RL: USES (Uses)  
(electron-beam **resists**, dry etch-resistant, in fabrication of microelectronic devices)  
IT 7782-44-7, uses and miscellaneous  
RL: USES (Uses)  
(reactive sputter etching by, silyl group-contg. **photoresists** in relation to)

L30 ANSWER 43 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN  
1984:129772 Document No. 100:129772 The development of oxygen reactive ion etch barriers based on poly(trimethylstannylstyrene).  
MacDonald, S. A.; Steinmann, F.; Ito, H.; Lee, W. Y.; Willson, C. G. (Res. Lab., IBM, San Jose, CA, 95193, USA). Polymeric Materials Science and Engineering, 49, 104-6 (English) 1983. CODEN: PMSEDG. ISSN: 0743-0515.

AB Poly(trimethylstannylstyrene) was successfully imaged by an electron beam at a dose of 1  $\mu\text{C}/\text{cm}^2$ . The polymer was O plasma resistant and useful in a 2-layer **resist** system. The Si analog, poly(trimethylsilylstyrene), exhibited similar characteristics.

IT **79716-05-5**  
RL: USES (Uses)  
(electron-beam **resist**, oxygen plasma resistant, for multilayer **resist** systems)

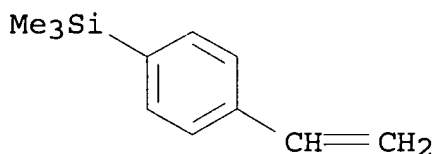
RN 79716-05-5 HCAPLUS

CN Silane, (4-ethenylphenyl)trimethyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 1009-43-4

CMF C11 H16 Si



CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

ST methylstannylstyrene polymer oxygen plasma resistance; methylsilylstyrene polymer oxygen plasma resistance; electron **resist** oxygen plasma resistant

IT Plasma, chemical and physical effects  
(oxygen, poly(trimethylstannylstyrene) **resist** resistant to)

IT **Resists**  
(electron-beam, poly(trimethylstannylstyrene) as oxygen plasma-resistant)

IT 77829-86-8 79716-05-5

RL: USES (Uses)

(electron-beam **resist**, oxygen plasma resistant, for multilayer **resist** systems)

IT 7782-44-7, uses and miscellaneous

RL: PRP (Properties)

(plasma of, poly(trimethylstannylstyrene) **resist** layers resistant to)

L30 ANSWER 44 OF 44 HCAPLUS COPYRIGHT 2005 ACS on STN

1983:566882 Document No. 99:166882 Copolymers of trimethylsilylstyrene with chloromethylstyrene for a bi-layer **resist** system.

Suzuki, M.; Saigo, K.; Gokan, H.; Ohnishi, Y. (Fundam. Res. Lab., NEC Corp., Kawasaki, 213, Japan). Journal of the Electrochemical Society, 130(9), 1962-4 (English) 1983. CODEN: JESOAN. ISSN: 0013-4651.

AB The etching characteristics, electron-beam exposure characteristics, and photoexposure characteristics were examd. for polymer films based on homo- and copolymers of trimethylsilylstyrene. The best results were obtained for the trimethylsilylstyrene-chloromethylstyrene (90/10) copolymer film which exhibited a high

sensitivity, a high dry etch resistance, and a high resoln. The material was suitable for a bilayer **resist** system.

IT 79716-05-5 87432-12-0 87432-13-1

RL: USES (Uses)

(**resist** from, characteristics of)

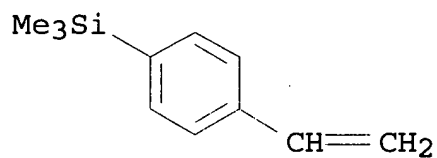
RN 79716-05-5 HCAPLUS

CN Silane, (4-ethenylphenyl)trimethyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 1009-43-4

CMF C11 H16 Si



RN 87432-12-0 HCAPLUS

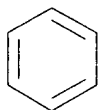
CN Silane, (4-ethenylphenyl)trimethyl-, polymer with (chloromethyl)ethenylbenzene (9CI) (CA INDEX NAME)

CM 1

CRN 30030-25-2

CMF C9 H9 Cl

CCI IDS

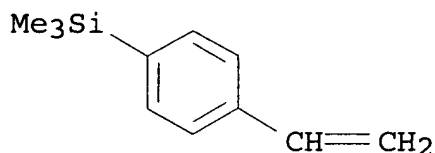


D1-CH<sub>2</sub>-Cl

D1-CH=CH<sub>2</sub>

CM 2

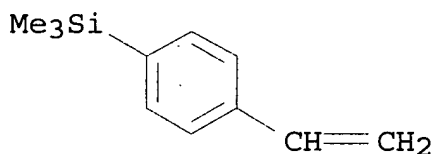
CRN 1009-43-4  
CMF C11 H16 Si



RN 87432-13-1 HCAPLUS  
CN 2-Propenoic acid, 2-methyl-, oxiranylmethyl ester, polymer with (4-ethenylphenyl)trimethylsilane (9CI) (CA INDEX NAME)

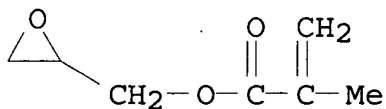
CM 1

CRN 1009-43-4  
CMF C11 H16 Si



CM 2

CRN 106-91-2  
CMF C7 H10 O3



CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

ST **resist** trimethylsilylstyrene chloromethylstyrene polymer; bilayer **resist** methylsilylstyrene copolymer; silylstyrene deriv polymer **resist**; **photoresist** methylsilylstyrene chloromethylstyrene copolymer; electron **resist** methylsilylstyrene chloromethylstyrene copolymer

IT **Resists**  
 (bilayer, trimethylsilylstyrene-chloromethylstyrene copolymer  
 for, characteristics of)

IT Vinyl compounds, polymers  
 RL: USES (Uses)  
 (polymers, **resists** from, characteristics of)

IT 52004-97-4 56486-71-6 79716-05-5 87432-12-0  
 87432-13-1  
 RL: USES (Uses)  
 (**resist** from, characteristics of)

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